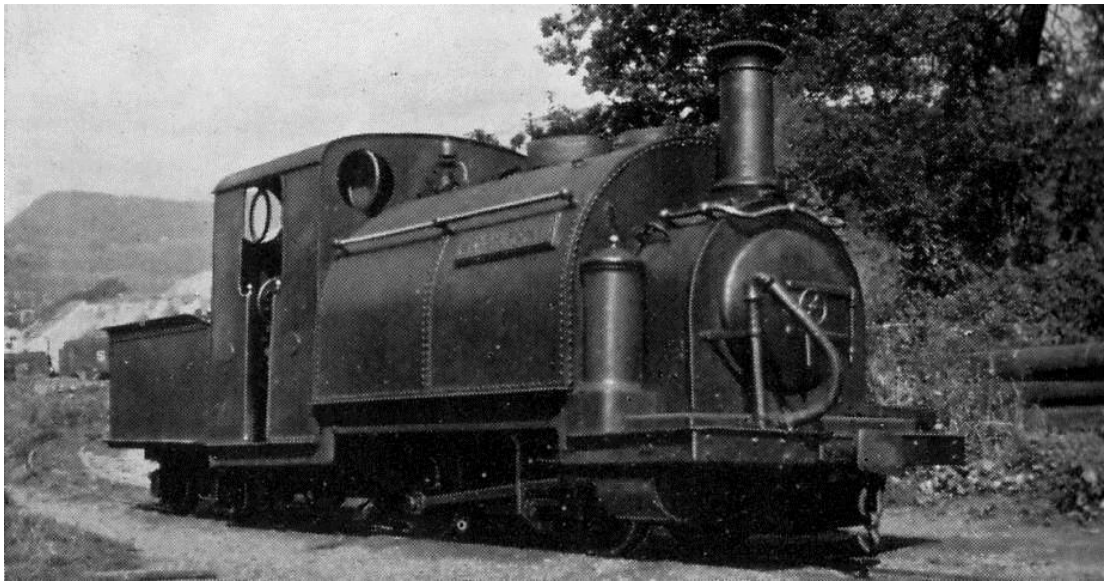
Rheilffyrdd Ffestiniog ac Eryri
Ffestiniog & Welsh Highland Railways

WELSH PONY
CONSERVATION
MANAGEMENT PLAN



The last known image of Welsh Pony *in steam published in* Railway Magazine *in 1938*

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CONSERVATION MANAGEMENT PLAN: ENGLAND LOCOMOTIVE *WELSH PONY*

1. INTRODUCTION

This document has been prepared for the Festiniog Railway Heritage Company, with the agreement of the Festiniog Railway Company (FR) and the Festiniog Railway Trust (FRT), in order to explore the options that are available to arrest the deterioration of the sole remaining FR 'large England' locomotive, *Welsh Pony*, and to ensure its long-term survival.

2. SUMMARY DESCRIPTION OF THE LOCOMOTIVE *WELSH PONY*

Welsh Pony is a 1'11½" gauge four-wheeled (0-4-0) saddle-tank-plus-tender locomotive, built in 1867 by George England and Company Ltd, at the Old Hatcham Ironworks in New Cross, east London. It was one of a pair of locomotives built to haul passenger and goods trains on the FR. In design terms, these locomotives were a slightly enlarged and improved version of four locomotives built for the FR in 1863/4, also by George England and Company. Somewhat inevitably, the two batches became known as the 'small' and 'large' Englands. Three of the 'small England' locomotives also survive, two of them (*Prince* and *Palmerston*) in working order. The third, *Princess*, is currently on display in the *Spooner's Café Bar* at Harbour Station, Porthmadog.

Welsh Pony is currently (March 2012) stored on the Festiniog Railway at Glan y Pwll depot in Blaenau Ffestiniog. It last worked in 1938.

3. OWNERSHIP

Welsh Pony is currently owned by the Festiniog Railway Heritage Company, a company ultimately controlled by the Festiniog Railway Trust. This conservation management plan will be subject to the approval of the Festiniog Railway Heritage Company.

4. EXISTING MANAGEMENT REGIME

There is, at present, no formal management regime in place for *Welsh Pony.* The FR General Manager, Paul Lewin, takes a personal interest in the locomotive to ensure it is stored in suitably secure conditions.

5. THE CONTEXT FOR A CONSERVATION MANAGEMENT PLAN FOR *WELSH PONY*

5.1 The Festiniog Railway

Welsh Pony was built for, and has always been associated with, the Festiniog Railway in Gwynedd, a system of international historic significance. That it would become one of the most famous railways in the world was not, however, obvious when it was constructed in the 1830s. It was built solely to provide a cost-effective form of transport for the roofing slates that were being quarried in increasing quantities in the area around Blaenau

Ffestiniog. Until then these had been laboriously carried by pack pony, sledge or cart to small wharves along the banks of the Afon Dwyryd for onward carriage by sea.

The line has many significant features, not least being the ingenious way in which the surveyor, James Spooner, had arranged a continuous gradient allowing loaded trains to run by gravity all the way from the quarries (700 feet above sea level) to the coast at Portmadoc, the empty waggons being hauled back by horses. As a horse-and-gravity mineral line in rough country, it followed established regional practice in using narrow-gauge track (two feet between rail centres), a very restricted structure gauge, and having a limited carrying capacity.

By the early 1860s, demand for roofing materials from cities that were growing rapidly as a result of the Industrial Revolution had boosted the FR's slate traffic to the point where the railway became overloaded and horses could no longer cope with the task of returning the large numbers of empty waggons to the quarries from the wharves in Portmadoc. The quarry owners were becoming very dissatisfied with the service they were receiving and began to explore alternative ways of getting their slate to market. This was, of course, a serious threat to the FR's business and something clearly needed to be done to increase line capacity.

The answer to the problem, regarded as very bold and experimental at the time, especially as it necessitated relaying the whole of the main-line track with stronger rails, was to introduce steam locomotives. However, this was the first time that it had been proposed to use steam power for relatively long-distance haulage on so narrow a gauge, and many eminent railway engineers – George Stephenson among them – advised against the move. Nevertheless, the railway went ahead with its plans, a specification and call for tender was issued, and the resultant 'small England' tank locomotives built by George England & Company were so successful, and so rugged, that three of the four still exist almost 150 years later.

Despite the success of this initial batch of locomotives, they were not the complete answer, as traffic continued to rise rapidly. The fleet of England locomotives became hard-pressed to handle the loads, even after reinforcements arrived in the form of the two 'large Englands' in 1867. Another bold move was required and, by the late 1860s, double-tracking of the entire line was being considered. At this point Robert Fairlie, the inventor of a patent double-ended locomotive, entered the picture and persuaded the FR to try one of his engines – the 0-4-4-0T *Little Wonder.* This was immediately successful and the result was a massive increase in line capacity and efficiency. Fairlie locomotives could haul much heavier trains than either type of England locomotive, the increased traffic was successfully accommodated and dividends rose to heights that attracted the attention of both the technical and financial press. The FR was paying huge dividends at a time when some of the largest British standard-gauge railway companies were generating very modest profits.

The fame of the railway grew to the point that, in 1870, an international commission of representatives from as far afield as Russia, France, Hungary, Sweden, Norway, Switzerland, Mexico and India attended trials at Portmadoc. During these trials the capabilities of the

narrow gauge, and the Fairlie locomotive in particular were fully explored and everyone who attended was greatly impressed. The result was an explosion of interest in narrow-gauge railways around the world.

In 1871, the FR was visited by William Jackson Palmer, an American Civil War general and railway engineer. The discussions that Palmer had with James Spooner and Robert Fairlie were the main reason why the Denver & Rio Grande Railway in Colorado was initially built to three-foot gauge. Between 1871 and the early 1900s, over 18,000 miles of narrow-gauge railways were built in the USA and many thousands of miles more in other parts of the world, all due in large part to the example provided by the FR.

The FR remained in the forefront of railway development for many years. Having, in 1865, become the first narrow-gauge railway in Britain to be allowed to run passenger trains it went on to introduce Britain's first iron-framed bogie carriages in 1872, and matched other companies in the introduction of safety features such as continuous brakes, a comprehensive telephone system, and single-line train-control equipment. It also continued to make good profits until the late 1900s.

Unfortunately, during the early years of the 20th Century, the slate industry began to decline, partly due to competition from cheap machine-made roofing tiles, and partly due to the long-term effects of a strike at the giant Penrhyn quarry near Bethesda. The decline was also accelerated by the loss of large and lucrative German markets during World War One.

Passenger traffic, mainly tourists by the 1930s, ceased in 1939 at the outbreak of World War Two. Slate traffic dwindled to a trickle and the railway closed entirely in 1946. No slate was carried after the railway was reopened as a tourist line from 1955 onwards, except for a small amount of short-distance traffic from the Maenofferen and Votty quarries in Blaenau Ffestiniog, which used a section of the FR main line to gain access to the slate wharves in the British Railways standard-gauge goods yards in the town until the early 1960s.

5.2 History of *Welsh Pony*

Welsh Pony was the first of the two ‘large Englands’ delivered in June 1867 to bolster the fleet of four ‘small Englands’ already in traffic since 1863/4. They carried significant improvements on the original locomotives drawn on four years of operating experience and also technical improvements that had occurred during that time. They had a longer wheelbase to improve their ride, a saddle tank containing 75% more water to improve their range and adhesion and a weather sheet to better protect the crew. The cylinder diameter was marginally increased, the boiler was made larger in diameter and length to give more heating surface and the operating pressure was raised from 130 to 150psi. The result was a significant increase in both power output and ability to put the power down on the rail. Technical improvements were the increased use of steel in the construction of both boiler and motion, larger eccentric straps, and brasses in the outside rods made in halves for easier maintenance. For the fire, a brick arch was specified *‘to keep the coal from going to the smoke box’* and a spark arrestor *‘to keep the ashes from setting fire to the woods’*.

C.E. Spooner could not resist testing the limits of the new locomotives and proved they could move prodigious loads on the level and travel at the then high speed of 25 miles an hour with safety. In early 1869 he communicated these findings to Robert Fairlie and convinced him of the advantage of narrow-gauge railways for difficult terrain. This led directly to both the capacity of the double Fairlie *Little Wonder* (which had to be equal to two of the Large Englands) and the second 'War of the Gauges'. So *Welsh Pony* and its success was a significant stepping stone on this route. The success of this design gave rise to thoughts of using it on other railways and the surviving original 'small England' locomotives were all rebuilt with this model in mind. The design proved rugged and reliable in service and led to the longevity which has allowed this 145 year old locomotive to be considered for restoration under this report.

The locomotive was withdrawn in late 1938 to await repairs that never took place due to the abandonment of passenger services, and the downturn in slate traffic, that occurred after the outbreak of World War Two in 1939. *Welsh Pony* was stored, under cover, in the Old Locomotive Shed at Boston Lodge, throughout World War Two, and during the period when the Railway was closed between 1946 and 1955. It was still largely complete, and in relatively good condition, when the new administration took over in 1954.

Welsh Pony had been earmarked for return to service by the new administration, but instead suffered a long period of storage and neglect. In the late 1950s it was housed in the Goods Shed at Porthmadog Harbour Station, along with the 'small England' *Princess*. However, for about twenty years from the early 1960s, storage was in the open air, close to the sea, in Glan y Mor Yard at Boston Lodge.

In 1985 *Welsh Pony* was mounted on a plinth outside Porthmadog Harbour Station where it stayed until 2002 when it was put back under cover.

5.3 Conservation Management Plans and Historic Locomotives

The only Conservation Management Plan (CMP) to have been previously prepared for an FR locomotive is that written in September 2004 for the 'Quarry Hunslet' *Lilla* by Dr David Gwyn and Jim Rees. *Lilla* was already in operable condition at that time, but the CMP for that locomotive has nevertheless been used as a guide in the preparation of this document. CMPs for historically significant assets such as steam locomotives are still few and far between, but this document has also been informed by CMPs carried out for Beamish Museum in the north-east of England and by evolving best practice set out by Cadw, the Welsh Government heritage agency, which recommends that historic artefacts and assets be managed in the light of their *evidential value*; their *historical value*; their *aesthetic value*; and their *communal value.*

5.4 The Locomotive *Welsh Pony* - description

5.4.1 Outline

Welsh Pony, as It currently exists*,* is an 0-4-0 steam locomotive – i.e. a locomotive with a four-wheeled, two-axle, chassis in which the drive operates to all four wheels by mechanical means. It operated on a rail gauge of l'll½", measured between the inside faces of the rails, and was coal-fired. It was originally delivered without an all-over cab, weather protection for the crew consisting of a rudimentary weatherboard with a turned-over top.

The main structural members are the frames, consisting of two longitudinal members and cross members. The two axles are set in conventionally-sprung sprung axle-boxes with their vertical movements in horn-guides in the longitudinal members; the wheels are located outside the frames. The cylinders are bolted on to the outside of the longitudinal frame members and the steam chests to the inside.

The boiler is free-standing, and is supported by the smoke-box and at the fire-box end. The fire-box is of the conventional water-jacketed type with a fusible plug fitted in the crown, and a blow-down valve. Fittings on the boiler back-head include a regulator handle and fire-hole door. The ashpan is fitted with a damper. The safety-valves are set at the top of the outer fire-box and are of the Salter type.

The boiler is of the conventional multi-tubular type, non-superheated. It is equipped with a steam dome in which the regulator is set and from which the steam is sent to the cylinders. The smoke-box is also of conventional type. The door is circular, and has a baffle. The door is opened by a pair of handles in its centre which turn a screw and a dart which engages with the dart-bar attached to the smoke-box front-plate. The chimney is set on a square cast-iron base and is topped with a cast-iron cap. Two cylindrical cast-iron sand pots, with cast-iron lids, are located one on each side of the smokebox.

Each of the cylinders is a casting bolted onto the outside of the main frame. With its associated steam chest and slide valves inside the frames, the assemblage is bolted to the longitudinal mainframe members. The pistons drive onto crank pins in the rear driving wheels, and the crank pins on each set of wheels are mechanically linked by a coupling rod. The Allan's straight-link valve gear is located inside the frames, controlled by a reversing quadrant set on the left-hand side of the cab. Water was stored in a saddle tank, filled from the top of the tank. A handrail is provided along both sides of the tank to facilitate use of a very narrow footplate that is located along the bottom of the tank on each side. The locomotive's nameplates were attached to the forward sides of the tank, one on each side. Water was fed from the tank into the boiler by two live-steam injectors. Coal was carried in a separate four-wheeled tender attached to the locomotive by a drawbar and safety chains.

The locomotive is provided with a cab with both front and back spectacle plates, fitted with round-pattern spectacle glasses. The cab backplate includes two folding doors which give access to the tender whilst the locomotive is on the move. The cab fittings are currently almost entirely missing.

The locomotive is equipped with a columnar screw hand-brake set against the back plate of the cab, operating on the rear two wheels. The locomotive is equipped with an automatic vacuum brake system, the ejector and control handles for which are missing. The precise nature of these is uncertain. The tender is separately vacuum-braked from the locomotive. The vacuum cylinder is located in the rear left-hand corner of the cab, forming a seat for the driver. A vacuum hose and coupling are mounted at the front of the locomotive and on the back of the tender, each on a swan-neck pipe. The hoses are carried on a dummy and carrier when the locomotive is not coupled to continuously-braked stock.

The front coupling on the locomotive was designed primarily for easy use with slate waggons and consists of a sprung centrally-mounted buffer with a chain and hook bolted to a drawbar located beneath it. Adapters are required to couple with the Norwegian 'chopper' buffer-couplings used on FR and WHR passenger rolling stock.

5.4.2 Principal Structural Materials

The dominant structural material of the locomotive is steel.

Many small items are normally made of brass. These would have included the nameplates, cab-side 'works' plates, the whistle, the safety-valve cover, the injectors, valves of various types, and some of the cab fittings.

The firebox is made of copper.

The firebox stays and boiler tubes are made of copper/brass respectively.

Steam and oil feed pipes, where they still exist, are of copper.

The wheel centres, cylinders and valve chests are of cast iron.

The gauge-glass fittings would have been made of gun metal.

The boiler lagging is thought to be wood, but may possibly be asbestos.

The separate components of the locomotive are mostly riveted together. Other components are attached to each other by imperial-sized bolts. There is little or no evidence of welding. Some brass parts would have been assembled by brazing pieces together.

5.4.3 Mechanical condition

These notes were compiled by Christopher Jones, and are based on a non-invasive examination carried out at Boston Lodge several years previous to the present document.

Boiler: This is thought to be life-expired. It is fitted with a copper firebox and the locomotive was reportedly withdrawn in 1938 due to major firebox problems. No work has

been carried out on the engine since that time. However restoration skills and techniques have developed considerably in recent times and it may be possible to use some of the original material. Only after thorough examination with the boiler removed from the locomotive will it be possible to give a definitive answer. This may partly depend on the kind of use planned for the locomotive.

In the event that it is life-expired, it is suggested that this boiler should be scrapped or devoted to museum use (it will be necessary to check for the presence of asbestos lagging before any action is taken). It could be replaced with a 180psi saturated-steam boiler. As with *Palmerston* and *Lyd*, it should be possible to build a new boiler that occupies the same physical space as the original, but with the detail constructional differences that are required to meet modern regulations. New cladding, a new smokebox and door, a new blastpipe, new petticoat, new dart-bar and dart will be required, but the chimney, smokebox handrail, handrail knobs and lamp bracket should be retained.

Saddle Tank: The tank frame and ends are in good enough condition to be conserved, and the top half of the exterior tank plating may also be in good enough condition for reuse. The bottoms of the tank legs and the inner saddle-tank plating need replacing.

Cab: The roof is heavily corroded and will require replacement. The rest of the platework is repairable.

Frames: The fitted bolts, and corresponding bolt-holes, by which the cylinders are attached to the frames need to be remade, as do the fitted bolts and bolt-holes for the frame stretchers and strengthening ribs. A frame adaptor is most probably required for attaching the rear drawbar. The original design transmitted haulage loads through the boiler shell. However, the practice of stressing pressure vessels in this way is now regarded as very dubious for safety reasons and was largely dispensed with by the turn of the 19th century. Preservation-era rebuilds of *Prince* and *Palmerston* eradicated this feature. It may be possible to retain this feature but it will require significant engineering input.

Cylinders and valve chest: These need descaling inside and out and the bores need to be measured. Care will have to be taken to assess the possible presence of asbestos in the cylinder lagging. It may be necessary to split the assembly into its two halves so as to make repair of the valve faces easier. The valve spindles, glands and neck rings will need to be replaced and the valves and valve faces will almost certainly need repairs. It will also be necessary to re-bore the cylinders, or to fit new liners and then rebore. New piston rings, and possibly new pistons, will be required. New piston glands may also be needed.

Outside motion: New brasses, oil caps, new piston rods, and new brass or white metal inserts for the crosshead are required. The slide bars need to be re-machined or replaced. A displacement-type lubricator is required, or a mechanical lubricator as per *Palmerston* could be fitted. The coupling/connecting rods may be re-useable but subject to inspection of the brass-retaining ‘square’.

Wheel sets: The tyres appear to have considerable wear left. The quartering and fit of the wheels on the axles needs to be checked. New crankpins may be required. The axle journals will require machining. New axle boxes are probably required, with new horn guides and fitted bolts. New springs are most probably required.

Inside motion: New pins and bushes are required throughout. Two new expansion links may also be required. The weighbar shaft is the wrong way round (see *FR Magazine* issue No.1, summer 1958) it will need machining to allow it to be turned the correct way. New die blocks, new eccentric straps and new sheaves may be required. A decision will have to be made whether to use grease or oil as a lubricant.

Fittings: The locomotive requires a complete set of valves, whistles, whistle manifold, pipework, ejector, injectors, steam separator for atomising steam, safety valves, regulator, brake valve and vacuum cylinder for brake, brasswork for boiler backhead and cab, steam and vacuum gauges, water gauges, regulator gland, quadrant, etc

Tender: This has received some cosmetic treatment and the wooden underframe has been repaired. It is, however, still in very poor condition and should go back behind *Princess*, where it was found in 1954, as a museum piece. The locomotive's original tender is believed to be the one now paired with *Linda*. This has been so heavily modified that it is unlikely to serve as anything other than a point of reference. A replica will be required for service with *Welsh Pony* using the current tender as a pattern including the tender brakes.

5.4.4 Age of Components Fitted to Welsh Pony

1867: Wheel Centres, inside motion rods, tank handrails. Continued use after restoration is feasible

1869: Outside rods, and slide bar supports. Continued use after restoration is feasible.

1875: Expansion links. Continued use after restoration is feasible.

1883: Sand pots and slide bars. Continued use of the sand pots is feasible after restoration, but the slide bars may need replacement.

1886: Rear axle. Possible use after restoration depends on the assessed condition of the steel when it is examined using non-invasive methods.

1891: Frames, footplates, tank and cab. Partial reuse will be possible after replacing material that is life expired.

1894: Leading axle. Possible use after restoration depends on the assessed condition of the steel when it is examined using non-invasive methods.

1896: Valve spindles, reversing lever. Continued use after restoration is feasible if the assessed condition permits.

1899: One eccentric strap. This is likely to be removed to stores and replaced with a replica

1903: (possibly later) Piston heads, slide valves. Continued use after restoration is feasible if the assessed condition permits.

1906: (or later) Both rear axle-boxes. Continued use after restoration is feasible if the assessed condition permits.

1910: Front footplate ballast/balance weights. Continued use after restoration is feasible.

1912: Boiler, firebox, regulator valve and smokebox. Worn out - replacement is required. Boiler could be preserved as a museum piece.

1915: Brass smokebox handrail, chimney . Continued use after restoration is feasible.

1923: Cylinders. Continued use after restoration will depend on the condition of the bores when these are examined.

Some additional components that could be reused may be stored in the Brass Foundry at Boston Lodge. A Hugh Phillips ejector, made in 1985, of the type fitted to *Prince*, has been secured for use on *Welsh Pony*.

5.4.5 Remedial work on Welsh Pony

The first recorded remedial work on *Welsh Pony* (and *Little Giant*) took place as early as mid-1868, when new cross-heads, slide bars, coupling and connecting rods, cylinder covers, piston rods, motion bars, etc., were supplied by George England at a cost of £373/8/0. This is interesting because the two locomotives had only cost £1,005 each when new, a year earlier. The size of the spares order could indicate either fundamental design problems, or (much more likely) major damage, possibly in the form of extremely rapid wear, due to overloading at a time when the FR was becoming overwhelmed with traffic.

As was the case with all of the other FR England locomotives that survived into the 20th century ('small England' *Mountaineer* was withdrawn in 1879), *Welsh Pony* was extensively renewed in the late 19th century. In 1890-91 a new boiler, built by the Vulcan Foundry of Newton-le-Willows, was fitted, along with a new smokebox, cab and saddle tank. New steel mainframes were also constructed, arguably making the resultant machine a new locomotive. Larger tyres on the driving wheels, 2' 3" in diameter, versus the 2' 0" of the originals, were also fitted.

The Vulcan boiler was condemned in 1910 and a replacement was ordered from Adamson of Ashton-under-Lyne in 1912. However, it is believed that this boiler was not delivered until after war had broken out in 1914 and that it was then one of the units charged to the government whilst the railway was under state control, which caused a certain amount of

official disapproval when the matter came to light after the railway was released from government control in 1919. The boiler was actually fitted to the locomotive during 1915.

The Adamson boiler failed a hydraulic test in late 1938. The locomotive was then withdrawn and stored under cover throughout World War Two, and during the period when the Railway was closed between 1946 and 1955. It was still largely complete, and in relatively good condition, when the new administration took over in 1954.

Thanks to the availability of a new boiler ordered for the 'small England' *Prince* during World War Two, that was the first steam locomotive to be restored to service, in 1955. During the reassembly of *Prince* some fittings were 'robbed' from *Welsh Pony* to replace items that had disappeared from *Prince* during the closure period, or were otherwise unsuitable for reuse.

For a variety of reasons, attention was then focused on getting the larger, more iconic, Fairlie locomotives back into service, with *Taliesin* (the former *Livingston Thompson*) going into service in late 1956, and *Merddin Emrys* following a few years later.

The then General Manager, Allan Garraway, considered *Welsh Pony* for return to service after the Fairlies – aside from the need for boiler repairs, it was in fair condition and was slightly more powerful than *Prince*. It was also believed, from the stories passed down through generations of Boston Lodge staff, that the 'large England's' were preferred by footplate crews over the smaller engines. However, it appears that there is no one now living who has first-hand experience of driving one. (NOTE – the tractive effort of *Welsh Pony*, assuming 27" diameter driving wheels and 180psi boiler pressure is 4,770lbs – compared with *Prince*, 4,352lbs,)

Unfortunately, the distraction caused by the ill-advised purchase of a Peckett 0-6-0ST from Harrogate Gasworks in 1957, followed by the 1962 locomotive crisis that led to the hiring of the Penrhyn Quarry Railway 0-4-0ST *Linda* – and the subsequent purchase of both *Linda* and sister locomotive *Blanche* – served to push *Welsh Pony* ever further down the queue for attention. With the later arrival of the ALCo 2-6-2T *Mountaineer*, and the construction of three new Fairlies, it has never since become a priority for restoration.

Until the late 1950s it was housed under cover, but for about twenty years from the early 1960s, storage was in the open air, where it suffered serious deterioration in overall condition.

In 1985 *Welsh Pony* was given some cosmetic treatment (mainly de-rusting and a coat of paint) and used as a marketing device, mounted on a plinth outside Porthmadog Harbour Station. A number of the more vulnerable, and valuable, small parts were removed at this time and put into storage. During its period on display it was again exposed to the corrosive effects of sea air. It might be said that the post-1954 administration has not treated this original FR locomotive at all well. Fortunately the deterioration in the locomotive's condition was significantly slowed in 2002 when it was removed from the plinth and put back under cover. A certain amount of work has subsequently been done to arrest the most obvious effects of long-term neglect and corrosion.

5.5 Conclusions

Welsh Pony has seen some changes to its design and many changes to its components since it was built. It has a long and important history which has included a lengthy period out of use, though railway enthusiasts have never lost sight of its history and significance. Its mechanical condition permits a restoration to active service with the renewal of some important components.

6 STATEMENT OF SIGNIFICANCE

Welsh Pony is an historic asset of international significance as part of the early locomotive fleet from the Festiniog Railway's transformative period of the 1860s, and as one of the oldest surviving narrow-gauge railway locomotives in the world. It is also significant as displaying the redesign, maintenance and replacement regimes that were necessary to sustain the operation of such machines from the 1860s to the 1930s. Its *evidential value* is high for this reason, as a machine that dates largely from the late 19th and early 20th centuries rather than from the 1860s; its *historical value* is outstanding for its early date of initial construction and as part of the traction system of an internationally-significant narrow gauge railway. Its *aesthetic value* is outstanding as a well-designed Victorian artefact with the potential to offer sensory, visual and intellectual stimulation, and its *communal value* is outstanding for the international recognition of the Festiniog Railway amongst railway enthusiasts and as a visitor attraction.

7 CONSERVATION PRINCIPLES IN ACTION

7.1 Options

There are several options for the future conservation of *Welsh Pony*. The principle ones are:

Restoration to 1867 as-delivered condition – or the condition in which the locomotive ran during the first period of operation.

Restoration to the condition in which the locomotive ran after the 1915 reboilering up to its withdrawal from traffic in 1938.

Cosmetic restoration of surviving material only with the objective or arresting further deterioration.

Take no action.

Take no action and produce an as-built replica.

7.2 Conservation Form

Restoration to 1867 as-delivered condition

Restoration of *Welsh Pony* to its 1867 state has much appeal, as none of the surviving locomotives are in this form, yet arguably this early period of operation represents a very successful era, and the time when the locomotives had their greatest impact on the operation of the Festiniog Railway. Major rebuilding in the 1890s and early 1900s resulted in the almost wholesale replacement of the fabric ('renewal' was the term applied by Boston Lodge) of all the surviving England locomotives. The rebuilds incorporated numerous new and improved parts, including new steel mainframes, which replaced the original wrought-iron frames. They were therefore arguably new locomotives.

As can be seen from the listing of the age of the various components, only a handful of fittings survive from the early period of *Welsh Pony's* service. Restoration to this condition would entail the loss, or transfer to storage, of much of the heritage material that made up the locomotive in 1938. This option would inevitably be very costly as it entails the re-creation of so many components, not all of which could be manufactured using original techniques and would thus require redesigning to use modern materials. It would also produce a locomotive of more limited practical use than the 1938-era version.

The result would be more replica than restoration, and the creation of such a replica might be better considered as a separate project - maybe to re-create either *Little Giant* or *Mountaineer* in their original form. The reservation about the practical use of *Welsh Pony* in its 1867 form would also apply to either of these replicas.

Restoration to 'end-of-service', 1938, condition

Restoration to 1938 condition is the most obvious option and the one which has been proposed most recently. The great appeal with this option is the significant volume of material that can be retained. The case for restoration to traffic versus other non-operational options hinges around providing a more secure future for the locomotive if it is operational, as it is perceived that working engines attract a supportive following – as amply demonstrated by *Palmerston*. Such a following is likely to lead to volunteer input and future funding for ongoing conservation and maintenance.

The case for this is made at great length in the article produced for *Steam Railway Magazine* in 2009 and presented here as an appendix. In order to fully determine the suitably of components for use in operational conservation it will be necessary to dismantle the locomotive to permit a more detailed examination. Given the extensive experience with historic locomotives at Boston Lodge this dismantling can be carried out with minimal damage to original materials. Some fixings would be lost but these can be replaced – in some cases from the same store that the originals came from.

This option is therefore recommended

Cosmetic Restoration

Cosmetic repair, combined with efforts to prevent the deterioration of surviving material, would benefit the locomotive considerably. As currently presented *Welsh Pony* is not an appealing exhibit. Following some cosmetic work five years ago storage arrangements have allowed only limited opportunities for maintenance. Successful cosmetic repairs need to be combined with the securing of long-term, under-cover accommodation to reduce the rate of deterioration and permit access for maintenance purposes. Currently there are no obvious locations on the F&WHR although the locomotive might be an appropriate exhibit for the WHHR museum at Gelert's Farm in the fullness of time. This kind of repair could have been carried out at any time over the past fifty years and one of the driving forces behind the current interest, in addition to the imminent 150th anniversary of steam on the FR, is the concern that many more years might pass without significant conservation effort.

Take No Action

There is always the option to do nothing. *Welsh Pony* has survived since last use even to the extent of the locomotive continuing to be mobile. Many fittings were removed during the period that the locomotive was on display at Harbour Station, with the result that there are far fewer items which are likely to be lost in future. However, some remaining parts, such as coupling rods and sand pots, could be removed with a little determination. The biggest concern is the continuing effect of corrosion. The years spent outside close to the sea have very obviously taken their toll on thin plate components, and concern must also be expressed for the loss of material from more substantial items such as the frames. Eventually corrosion could damage the locomotive to the point where any possibility of a return to traffic is lost.

Take No Action and Produce an As-built Replica.

This would be by far the most expensive and time-consuming option. It would also produce a locomotive of negligible historical value and limited practical use. As noted above, the creation of such a replica might be better considered as a separate project - maybe to re-create either *Little Giant* or *Mountaineer* in their original form.

7.3 Anticipated Incorporation of Existing Material into Conservation Options

	1867 Operating Condition	1938 Operating Condition	Cosmetic Only	No Action
Cylinders	Maybe¶	Maybe¶	Yes	Yes
Smokebox handrail	No	Yes	Yes	Yes
Chimney	No	Yes	Yes	Yes
Boiler, firebox, regulator valve	No	No	Yes	Yes
Smokebox and smokebox door	No	No	Yes	Yes
Front footplate ballast/balance weights	No	Yes	Yes	Yes
Rear axle boxes	Maybe¶	Maybe¶	Yes	Yes
Piston heads	Maybe¶	Maybe¶	Yes	Yes
Slide valves	Maybe¶	Maybe¶	Yes	Yes
Eccentric Strap	No	No	Yes	Yes
Valve spindles	Maybe¶	Maybe¶	Yes	Yes
Reversing lever	Maybe¶	Maybe¶	Yes	Yes
Leading axle	Maybe¶	Maybe¶	Yes	Yes
Frames	No	Yes*	Yes	Yes
Footplates	Yes*	Yes*	Yes*	Yes
Tank	Yes*	Yes*	Yes*	Yes
Cab sides	No	Yes*	Yes*	Yes
Cab roof	No	No	No	Yes
Rear axle	Maybe¶	Maybe¶	Yes	Yes

Sand pots	Yes?	Yes	Yes	Yes
	1867 Operating Condition	1938 Operating Condition	Cosmetic Only	No Action
Slide bars	No	Maybe¶	Yes	Yes
Expansion links	Yes	Yes	Yes	Yes
Outside rods	No	Yes¶	Yes	Yes
Slide bar supports	No	Yes	Yes	Yes
Wheel centres	Yes	Yes	Yes	Yes
Inside motion rods	Yes¶	Yes¶	Yes	Yes
Tank handrails and handrail knobs	Yes	Yes	Yes	Yes
Dome Cover	No	No	No	Yes
Front buffer and coupling	Yes¶	Yes¶	Yes	Yes
Tender	No	No	Maybe	Maybe

* Some replacement metal plate may have to be welded in, or wastage replaced by weld.
¶ Subject to inspection

7.4 Suggested Procedures for Examination Prior to Restoration

During the examinations, no damage must be done to the existing fabric of the locomotive.

The initial examination should be restricted to what can be seen or got at easily. The cylinder bores are known to be oiled and the pistons are in situ. The frames are largely visible. The inside motion, outside motion, etc., can be examined, measured and photographed before being replaced. The thickness of plating on the cab, tank, smokebox can be measured using ultrasonic techniques. The exhaust casting can be similarly inspected. The wheels can be stripped of paint to look for defects in the centres or tyres. The cylinders can be examined to check dimensions, the thickness of the walls of the bores and flange damage. The valve chest can be opened and the valves, valve faces and neck rings examined. The slide bars, crossheads and supports can be stripped of paint and also examined. The reverser and quadrant can be examined for possible re-use.

If no serious problems are found during the initial examination, the second stage would be to lift the locomotive and remove the wheel-sets. Then The bearings and journals can then be visually inspected and the axles tested ultrasonically. The frames can be stripped and examined by dye-pen technique. The weighbar shaft and reach rod can also be stripped and examined. The horn guides and fitted bolts can be examined, and the eccentric straps and sheaves inspected for possible reuse.

The third stage is more problematical in that it is known the 'Old Company' used asbestos for insulating boilers and cylinder casings. Therefore the removal of the water tank will expose an unknown quality of steel cladding possibly concealing asbestos cladding round the boiler. Any asbestos will have to be managed in a hermetically controlled environment. This will allow final inspection of the underside and hump of the tank and the top of the main frames and the step frames that support the tank.

7.5 Known Defects

The cab roof is known to be very thin.

The saddle tank has developed holes on the fireman's side at the front and one inside the cab (caused by a chipping hammer!) It is likely the bottom third of the tank is not structurally sound.

The dome cover is lop-sided and probably very thin.

The smokebox door has large holes in it.

The weighbar shaft is probably the wrong way round (FR Magazine No.1, summer 1958, explains)

Some of the maintenance techniques used in the mid-20th century are suspect. Tyres were fitted to wheels, and wheel centres to axles, using thin sheet-metal shims when things got loose. Packing pieces would also be used in motion parts and axle boxes, rather than remetalling components. Bolts were sometimes used rather than hydraulically-closed rivets.

7.6 Preservation of Existing Components

All major components of the locomotive that are replaced should be identified and retained as exhibits, as part of, and subject to, the FR's evolving collections management policies. All such components should have a tag attached listing its unique accession number, cross-referenced with the archive - see 7.11 below.

7.7 Installation of New Components

The installation of new components should be driven by safety and/or legislative considerations and undertaken cautiously. The process should be fully controlled by archiving - see 7.11 below. Where appropriate, date-stamping of components should be undertaken.

7.8 Appearance and Finish

The appearance and finish of the locomotive should reflect the FR tradition of a high degree of skill in the painting, lining and the application of company crests etc., to locomotives and rolling stock. Evidence of earlier paintwork should be colour-matched and recorded.

7.9 Reference to Original Drawings

There are very few drawings of these engines at Boston Lodge. As they have not formed part of the working fleet there has been no pressure to develop this result. It would be most helpful if copies of drawings could generated from the archives in order to better inform the restoration process as listed below.

XD97/470002/1	L 2	19 Sept. 1890	Cross-head 'Palmerston'/'Welsh Pony'.Workshop copy with notes.
XD97/470020	L 20	10 Nov. 1891	Locomotive 'Prince': tank made in March 1892
XD97/470021	L 21	19 Sept. 1890	Frames 'Welsh Pony': mild steel 5' wheelbase.
XD97/470022	L 22	7 Sept. 1888	Brass funnel for locomotives.
XD97/470042	L 42	n.d.	Cross-head 'Welsh Pony'/ 'Palmerston'.
XD97/470051	L 51	1 Aug.1890 (red) altered 19 March 1904	Boiler for 'Welsh Pony' and specification.
XD97/470060	L 60 Gresham& Craven 3416.93 CM 4/1893	19 April 1893	Vacuum brake arrangement 'Welsh Pony'/'Little Giant'. Gresham & Craven.
XD97/470062	L 62VF tracing 8365 B/p Drawing 2213/04	27 July 1904	Boiler for 'Welsh Pony' and 'Little Giant' 'Corrected March 20 1905'. Vulcan Foundry. Lagging details added by A.G.W. Garraway.
XD97/470063		22 Dec.1892	'Welsh Pony' and 'Little Giant. General arrangement
XD97/470073	L 73	1 Sept. 1890	Boiler for 'Welsh Pony' and 'Little Giant' with specification.Annotated.
XD97/470073/1		n.d.	Sketch of boiler and smokebox of 'Welsh Pony'.
XD97/470096	L 96	10 Jan.1891	'Welsh Pony': firebox mounting.
XD97/470097	L 97	3 Sept.1891	Pistons for 'Welsh Pony' and new 'Little Giant'.('Palmerston/Prince' crossed out). 'Two new pistons for 'Little Giant' June 1904'.
XD97/470101	L 101	25 Nov. 1890	Reversing rod end and crank 'Welsh Pony'.
XD97/470104	L 104	n.d.	Slide valve for cylinders being built by Great Western Railway.
XD97/471596	1596	20 July 1883	Festiniog Railway Nos. 5/6 blast

pipe (exhaust pipe).'Welsh Pony'
'Little Giant'.

7.10 Recording

A detailed photographic and written record of all changes made to the locomotive, with a full account of all suppliers, specifications and materials used, should be created. Modifications to old components, and details of new components, should be recorded in CAD format. Hard copies should be produced of all digital files.

7.11 Archiving

All paper records generated by 7.10 above should be made in duplicate, with one copy kept at Boston Lodge Works, and the other deposited with the FR archive at the Caernarfon Record Office of the Gwynedd Archives Service on an 'open access' basis. A unique accession number should be given to each component removed from the locomotive.

7.12 Safety

A risk assessment detailing risks to members of groups, or individuals, involved in any aspect of the restoration of *Welsh Pony* should be prepared before any work is carried out.

7.13 Statutory Compliance

The locomotive will be subject to the specification of the boiler insurers, to Health and Safety at Work regulations, and to the requirements of HM Railway Inspectorate.

8 BIBLIOGRAPHY

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