



Llyn Tegid Reservoir Safety Appraisal:

Preliminary Landscape & Visual Appraisal

June 2018

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1. INTRODUCTION

1.1 Background

Black & Veatch has been appointed by Natural Resources Wales (NRW) to develop the outline design for proposed reservoir safety improvement works to the impounding structures at Llyn Tegid. The works are likely to consist primarily of embankment protection / strengthening to allow safe overtopping during the design storm event. This will include reinforcement of landward/downstream face with a buried 3D geotextile mat ('Enkamat' or similar), and upgrading of existing rip rap upstream slope protection, including importing additional material.

This preliminary landscape and visual appraisal has been prepared to support the planning and EIA screening and scoping process, and also to inform the development of outline design. This appraisal does not constitute a formal Landscape and Visual Impact Assessment (LVIA) in accordance with the Guidelines for Landscape and Visual Impacts Assessment, 3rd Edition (Landscape Institute and IEMA, 2013) (GLVIA3), but broadly follows the general principles set out in GLVIA3.

1.2 Site Area and Context

A Landscape and Visual Environmental Constraints and Opportunities Plan is provided at Appendix A, and shows the site context and relevant designations and features. This appraisal should be read in conjunction with the plan.

Llyn Tegid is the largest natural lake in Wales, first modified for use as reservoir by Thomas Telford to support the flow of the Ellesmere Canal. There is now approximately 2,950m of embankment at its northern end. The A494 bridge over the Afon Tryweryn demarcates the northern extent of the embankments considered by the project. There is also a bridge over the River Dee (B4391), with the reservoir embankments to the west. Outflows from Llyn Tegid flow underneath the Dee Bridge towards the confluence with the Afon Tryweryn.

The outflow is regulated by Bala Sluices, a gated control structure that regulates the combined outflow from Llyn Tegid and the Afon Tryweryn. This allows for Llyn Tegid to be used for flood storage and to regulate the River Dee downstream.

The proposed development is located within a 'sensitive area' as defined under the Town and Country (Environmental Impact Assessment) (Wales) Regulations 2017. The site is within Snowdonia National Park, and Llyn Tegid makes an important contribution to the highly valued landscape and scenic quality of the area. The scenic quality, coupled with varied recreational opportunities, also make the site area a very popular tourist destination, particularly in summer (see plates 1.1 & 1.2 below).



Plates 1.1 & 1.2: Visitors at Llyn Tegid during peak times (May bank holiday and mid-June 2017)

The lake and associated watercourses are of national and international ecological importance, protected under the River Dee and Bala Lake Special Area of Conservation (SAC), Llyn Tegid Ramsar site and two Site of Special Scientific Interest (SSSI) designations, Llyn Tegid SSSI covering the lake and River Dee SSSI covering the Afon Tryweryn and River Dee.

1.3 The Preferred Option

Following an options appraisal process, a preferred option has been selected and is currently being developed towards Outline Design stage. The proposals are summarised below and on the Site Plan drawing provided at Appendix B. The overall site working area is approximately 6.6 hectares.

Protection of the River Dee embankment (left bank).

Protection of the River Dee embankment (left bank) (i.e. the works, indicated on the Site Plan, between the B4391 Road Bridge and disused Railway Bridge).

- A 6m wide berm will be installed on the downstream / dry side toe along some sections of the embankment, increasing the ground levels typically by 300-400mm. This is necessary to ensure stability of the embankment under various water loading conditions. The approximate extents of this are indicatively shown on the overview plan (Appendix A), however these extents are conservative and likely to reduce during design development.
- Embankment protection is likely to consist of a 3D geotextile membrane installed under the topsoil surface on the crest and the downstream / dry side of the embankment, re-covered with topsoil and grassed as existing. The protection will extend over the berm where present, or otherwise approximately 2m beyond the existing embankment toe line.
- There are no expected significant changes in the visual scale of the embankment itself, despite minor changes in crest levels to reinstate the 'as-built' levels where necessary, and the formation of the berm noted above.
- There will be tree and vegetation clearance required to enable works, mainly as a result of the construction of the berm.
- Note – there were initially expected to be similar protection works on the right bank of the Afon Tryweryn, but this is no longer considered to be a requirement.

Protection of the northern lake embankment (i.e. the works, indicated on the Site Plan, between the Watersports Centre and the B4391 Road Bridge):

- A 6m wide berm will be installed on the downstream / dry side toe along some sections of the embankment, increasing the ground levels typically by 300-400mm. The approximate

extents of this are indicatively shown on the overview plan (Appendix A), however these extents are conservative and likely to reduce during design development

- Embankment protection is likely to consist of a 3D geotextile membrane installed under the topsoil surface on the crest and downstream / dry side of the embankment, re-covered with topsoil and grassed as existing. The protection will extend over the berm where present, or otherwise approximately 2m beyond the existing embankment toe line.
- 'Rip rap' works: the existing slate stone rip-rap protecting the upstream (wet side) of the embankment will be removed, re-laid and supplemented with additional imported granite stone. This is needed to absorb wave energy more effectively, when there are high winds on the lake. The larger pieces of existing slate may need to be broken up to make smaller pieces, and all the slate will be re-laid in a more angular fashion, rather than laid flat as existing. Proportionally the imported granite will make up approximately 50%-75% of the overall stone rip-rap. Visually this face of the bank will become harder (existing vegetation to be removed) and the stone will be 'rougher' / more angular, as required to improve performance in reducing wave energy.
- There are no expected significant changes in the visual scale of the embankment, despite minor changes in crest levels to reinstate the 'as-built' levels where necessary, and the formation of the berm noted above.
- There is on-going consideration of options to realign the embankment at the 'bandstand', which could result in some incursion into the ecologically protected lake foreshore. Based on initial sketches, the current estimated 'worst case scenario' option would result in approximately 1,400m² land take from the designated SAC / RAMSAR / SSSI site.
- Vegetation clearance, comprising removal of all existing trees / scrub / hedges within the footprint of the embankment, plus within a 5m offset from the upstream (wet side) toe, within a 2m offset from the existing downstream (dry side) toe, and to accommodate the formation of the berm where present. This is required in order to complete the strengthening works as described and improve the long term integrity of the embankments
- There is potential to protect and retain specific individual trees in the area of the downstream (dry side) toe line. (These are not shown on the Site Plan, but some strong specimens have been identified and discussed on site, for confirmation during detailed design).

1.4 Environmental Enhancement opportunities

An environmental mitigation and enhancement strategy is being developed and will continue through the outline and detailed design stages. Some potential measures are on NRW owned land, whilst others are subject to landowner agreements. We will continue to consult with SNPA during the design development process to agree the proposed works. The measures highlighted below are currently being explored:

- We are investigating the potential for rationalisation of the car parking on the lake foreshore adjacent Bala Watersports and Adventure centre, which would release land within the designated sites for habitat restoration;
- We are considering wet grassland habitat development and scrapes, along the left bank of the River Dee and on both sides of the Afon Tryweryn, downstream of the Pont Y Bala bridge.
- Removed hedges (dominated by hawthorn) to be replaced with new hedges of equivalent or greater linear extent, providing increased species diversity, frequent native hedgerow trees, and improved ecological resilience and connectivity.
- Identification of particularly valuable trees on the downstream embankment faces which have the potential to be retained and protected.

2. BASELINE CONDITIONS

2.1 Landscape Character

The study area is considered to be high sensitivity and value in terms of landscape character. The majority of the proposed works are within Snowdonia National Park (SNP), NRW's National Landscape Character Area (LCA) 06: Eryri/Snowdonia, and SNPA's LCA16: Llyn Tegid A Dyffryn Dyfrdwy/ Upper Dee Valley. Key aspects of the landscape character include:

- Landscape defined by the deep glacial basin of Llyn Tegid;
- Land rising up either side to create a classic U-shaped valley;
- River Dee (Afon Dyfrdwy) and its tributaries flowing through the landscape;
- Historic pattern of small, irregular fields divided by stone walls or hedgerows with frequent hedgerow trees;
- Strongly pastoral landscape;
- Llyn Tegid recognised as an internationally important mesotrophic lake supporting valued swamp and wetland habitats along its shoreline;
- Much of the area within the Bala landscape of Special Historic Interest;
- A sparse settlement of farmsteads and small hamlets nestled in valleys, linked by winding lanes and tracks;
- Tracts of open access and common land on higher ground;
- Landscape with a strong sense of place, surrounded by spectacular scenery with views afforded to Meirionnydd hills and mountains.

The works are on the periphery of SNP, adjacent Gwynedd Council's LCA12: Llandderfel, Bala Hinterland Special Landscape Area and NRW's National LCA15 Dyffryn Dyfrdwy A Llangollen / Llangollen and the Vale Of Dee.

LANDMAP is the formally adopted methodology for landscape assessment in Wales, and NRW expects all landscape impact assessments in Wales to apply the use of LANDMAP. NRW, SNPA and Gwynedd Council have analysed LANDMAP in their landscape character assessments. These character assessments have therefore been used to inform the landscape baseline.

2.2 Historic Landscape

The entire works area is within 'Bala and Bala Lakes Registered Landscape of Special Historic Interest'. Key features of this designation include:

- 19th Century enclosed field systems in the Bala hinterland;
- Well defined earthworks relating to the dismantled Bala and Ffestiniog Railway; and
- Open pasture with mature trees in the River Dee floodplain

There are three Scheduled Monuments within 500m of the proposed works:

- Castell Gronw Castle Mound, part of the Llanfor Roman Military complex, just south of the River Dee / Afon Dyfrdwy outlet from Llyn Tegid;
- Tomen Y Bala Castle Mound, just south of Pont Y Bala and within Y Bala Conservation Area;
- Llanfor Roman Fort and Camps, to the north of the River Dee and Afon Tryweryn confluence.

Embankment protection works on the Afon Tryweryn were considered but excluded during the options appraisal; with this exclusion there are now no proposed works within or adjacent to Y Bala

Conservation Area, and no likely direct or indirect effects on any Listed buildings or structures (including the Grade II Listed Pont Y Bala bridge).

2.3 Description of Local Landscape Features

The northern shore of Llyn Tegid is a popular recreational area and visitor attraction, with a well-used Public Right of Way (PROW) along the embankment crest, and leisure facilities in close proximity, including Bala Rugby Club, Penllyn Leisure Centre and Bala Watersports and Adventure Centre (see Plate 2.1). The watersports centre and adjacent car parking area have been designed with attention to use of local materials, including slate stone surfacing to the car park. The lake is separated from Bala town centre by a strip of land designated as Green Wedge.



Plate 2.1: Bala Watersports and Adventure Centre

Plates 2.2 and 2.3 below show typical views along the Llyn Tegid lake embankment, with a hedgerow running along the downstream toe line and trees mainly concentrated on the upstream face, although some are also present on the downstream face. The hedgerow is predominantly hawthorn and considered to be species-poor.

The trees within the upstream embankment face are self-seeded, mostly semi-mature, and have developed through a lack of maintenance rather than by design. They are predominantly ash, and are currently showing signs of ash die-back. This, coupled with their sub-optimal environment (within the embankment and between slate stone rip rap), means they would be unlikely to achieve a healthy or mature form. The trees on the downstream face are more sparsely located and generally of a better form and health than those on the upstream face, with some notable specimens worthy of retention if possible.



Plate 2.2: Lake embankment, looking east

The effect of the dense tree line along the upstream face is to limit views from the PROW to the lake. Where there are gaps in this tree line and views of the lake open up (see plates 2.3 and 2.4 below) this benefits the visual amenity for users of the PROW.



Plate 2.3: Lake embankment, looking west

The development of trees and scrub has not been limited to the lake embankment but has extended into the lake foreshore. There have been recent (during 2018) clearance operations undertaken by SNPA Lake Wardens targeting willow scrub from this foreshore area, as seen in plate 2.4 below. This has been undertaken as an ecological management measure to limit the drying out of the SAC foreshore.



Plate 2.4: Lake embankment, looking east, with evidence of recent willow scrub clearance

There is existing stone protection or 'rip rap' to the upstream face of the lake embankment, consisting of flat pieces of slate stone. Despite this the embankment has a largely green and vegetated appearance when viewed close up (plate 2.4) or from greater distance (plates 2.5, 3.1, 3.2), due to the amount of grassy vegetation and trees which have been able to establish around this protection.

Close to the seating area known locally as 'The Bandstand' there is a kink in the alignment of the lake embankment (see plate 2.5 below). The seating area is a small tarmac space edged with a concrete bench, and provides extensive views across the lake from the roadside.



Plate 2.5: Lake embankment looking west, the 'Bandstand' seating area in foreground, Rugby Club building mid-frame

Bala Railway, a local visitor attraction, runs along the south east of Llyn Tegid, and the Bala Railway Trust is currently promoting a proposal to extend this railway along the line of the northern Llyn Tegid embankment. The proposed alignment would run along the road past the Bandstand shown above, before crossing onto the embankment crest and running past the Rugby club.

The embankment on the left bank of the River Dee is much less enclosed than the lake embankment, with open views across the river and adjacent fields (see plate 2.6 below).



Plate 2.6: River Dee, left bank, looking south west towards Llyn Tegid

There are occasional trees within the embankment footprint, including one or two notable specimens that should be protected and retained if possible. This includes a mature oak at the end of a line of sycamore, as shown in plate 2.7 below.



Plate 2.7: River Dee left bank, looking north towards Bala Enterprise Park, mature oak in foreground.

2.4 Visual Amenity:

The study area is considered to be highly sensitive in terms of visual amenity. Llyn Tegid, and the banks, footpaths and foreshore at its periphery, make an important contribution to the highly valued scenic qualities of the area. The site area is a popular tourist destination offering a range of recreational activities such as sailing / watersports, fishing, motorcycling, walking and cycling, the enjoyment of each of which is closely associated with the visual qualities of the area.

3. PRELIMINARY CONSIDERATION OF LIKELY SIGNIFICANT EFFECTS

Given the high sensitivity of the study area to landscape and visual effects, if the potential for significant effects cannot be ruled out, a full LVIA would need to be undertaken during the design development stage and to support the planning application.

3.1 Key Landscape Receptors:

Key landscape receptors potentially affected by the preferred option are:

- National Landscape Character Area (LCA) 06: Eryi/Snowdonia
- SNPA's LCA16: Llyn Tegid A Dyffryn Dyfrdwy/ Upper Dee Valley
- Bala and Bala Lakes Registered Landscape of Special Historic Interest
- Green Wedge designated land
- Local character and scenic quality of the lakeside area and PROWs
- Tree lines and hedgerows alongside the affected lake and river embankments

3.2 Likely Landscape Effects

In terms of effects on landscape character, the scale and nature of the proposed works is considered too small and subtle to have any likely significant effects on broad landscape character

classifications, the Bala and Bala Lakes Registered Landscape of Special Historic Interest, or the special character of Green Wedge designated land.

The final two categories of landscape receptor noted above are local features and have more scope to be affected. Both are interrelated and are discussed together below.

The local character and scenic quality of the lakeside area and PROWs is likely to experience some change as a result of the preferred option, due to the loss of trees and hedgerows alongside the embankments. There will be a very visible and noticeable change in the appearance of the north shore of Llyn Tegid due to the comprehensive removal of trees from the upstream (wet side) of lake embankment, and this has the potential to trigger local interest and concern. The experience of walking along the PROW on the embankment crest will be notably different due to the loss of trees and hedgerow. Whilst tree loss should generally be avoided where possible due to the landscape, visual amenity, ecological /wider environmental and health benefits they provide, there are several mitigating circumstances in this case:

- The reservoir embankments are functional engineering structures and it is inappropriate for trees to be located within them, diminishing their strength and resilience to storm events.
- All of the trees along the Llyn Tegid upstream lake embankment face are self-seeded and have developed relatively recently as a result of lack of maintenance and not by design; removing them will be a return to the previous 'as built' condition of the embankment.
- The removal of trees from the upstream lake embankment will open up views of the lake from nearby receptors, including users of the PROW on the embankment crest. It may also increase the sense of personal safety / natural surveillance along the embankment crest, and levels of natural light reaching adjacent property such as the leisure centre. These may be considered positive outcomes.
- The majority of trees to be removed from the Llyn Tegid upstream embankment face are ash, which are currently showing signs of ash die-back. This, coupled with their sub-optimal location growing within the embankment between stone rip-rap, means they would have been unlikely to achieve a healthy or mature form if retained.
- The trees on the downstream face of the lake embankment are a relatively recent feature, not part of the original structure.
- It may be possible to protect and retain some of the best individual trees on the downstream slopes. This will be explored and confirmed during detailed design.
- A mitigation planting strategy is being developed focussed on replacing the ecological function and value of the existing tree lines. This will aim to ensure no net loss in ecological resilience or connectivity.

Along with the effects of vegetation clearance, the local character and scenic quality of the lakeside area could be affected by the rip rap improvement works. In combination with clearance, this is likely to result in a 'hardening' of the appearance of the downstream lake bank. This embankment face currently reads as a fundamentally green / vegetated lake edge, despite the existing slate stone rip-rap, but this would change to a harder, un-vegetated slope as a result of the proposals. Whilst this could well be perceived as a big change locally, it also constitutes a return to something more similar to the original appearance of this bank, before the incremental development of vegetation.

With the introduction of a new and different type of stone, to be blended with the existing slate stone, there may be a risk of a less uniform or harmonious appearance than as existing. During the detailed design stage it will be important to consider the visual effects of this and how the new stone is blended with the old, and how the stone sizes and rougher visual texture will look. A landscape architect will be involved in this design process, however despite the change in

appearance it is not considered likely to result in significant impacts on the overall scenic quality of the lakeside. It is also noted that there is already some use of imported granite stone that has been incorporated into the slate rip-rap where repairs have been needed (see Plate 3.3).



Plate 3.1: View from the foreshore looking east along the lake embankment upstream face



Plate 3.2: View from car park adjacent Bala Watersports and Adventure Centre, looking toward the embankment upstream face



Plate 3.3: View of embankment upstream face where ramp provides access to crest (close to ‘bandstand’); slate rip-rap has been supplemented with imported granite

3.3 Key Visual Receptors

The key receptors of potential visual effects are identified as:

- Users of nearby leisure facilities including PROW, Penllyn Leisure Centre, Bala Rugby Club, Bala Adventure and Watersports Centre (and the adjacent picnic site), recreational lake users including sailors and anglers;
- Users of the Loch Café;
- Motorists / pedestrians using the A494 and Heol Tegid;
- Cyclists on regional cycle routes 12 and 15;
- Potential future users of Bala Lake Railway (if extended);
- Households with views of the proposed development.

3.4 Likely Visual Effects

Potential significant visual effects could be expected if there were:

- Any loss or reduction of views of lake for key receptors
- Adverse changes to existing views for key receptors

Neither of the above are considered likely to result from the preferred option. The proposals will not result in a change in the visual scale of the embankment structures (the minor regulation of levels, and creation of a berm, are unlikely to be perceived as a major change in appearance), and no significant new structures such as wave return walls to be added.

The most significant change in the appearance of existing views will be due to the vegetation clearance (similarly to landscape effects). This will result in opening views up across the lake for users of the lakeside PROW and adjacent receptors, and as such can be seen as a positive visual effect.

The combination of tree loss on the downstream embankment face and relaying / extending of stone rip rap is likely to result in a hardening of the appearance of the downstream embankment. The 'roughening' of the rip rap will also be a visual change, with a more textured appearance. Whilst this may be perceived as a big change, and could result in extensive local interest and concern, it constitutes a return to something more similar to the 'as built' appearance of this bank.

4. CONCLUSIONS

The general nature and scale of the proposed works might be described as 'accelerated management and protection' of the existing infrastructure, rather than a major change or development of the existing infrastructure. Despite some noticeable changes in appearance which could give rise to local interest and concern, the greatest visual changes involve a return to something more similar to the 'as-built' appearance, and it is not therefore considered likely that any significant adverse landscape or visual effects would result from the preferred option. As such, it is not intended that a formal LVIA be produced during detailed design.

However, given the sensitivity of the area and the receptors, it is important that landscape and visual issues continue to be considered fully during detailed design. A landscape architect will be involved throughout the outline and detailed design stages, with input to the development of landscape reinstatement, mitigation and enhancement works, and the design of rip-rap improvement works, all of which will involve full consultation with stakeholders, including SNP Authority. The importance of effective engagement with the local community is also recognised, and a public drop-in exhibition is currently being planned, which will help explain the reasons for the scheme and the need for the tree clearance; on-going community engagement will be key as the scheme develops towards, and during, construction.

Appendix A:

Llyn Tegid, Environmental Constraints and Opportunities Plan, Sheet 4 of 4, Landscape and Visual
(drawing no. 12782-BVL-Z0-0-DR-I-05_P01)

Appendix B:

Llyn Tegid Site Plan – Project Overview (Drawing: 122782-BVL-Z0-00-SK-C-10002_P01)