



**Scottish Water**

**Milngavie Reservoirs  
Landscape Site  
Management Plan  
Management Action  
Plan**

**Final Report**  
Prepared by LUC  
February 2024



**Scottish Water**

**Milngavie Reservoirs Landscape Site Management Plan**  
**Management Action Plan**


**Project Number**  
 12413

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# Contents

	<b>Chapter 12</b>	<b>36</b>
	<b>Summary Action Plan</b>	<b>36</b>
<hr/>		
<b>Contents</b>	<b>i</b>	
<b>Chapter 1</b>	<b>1</b>	
<b>Introduction</b>	<b>1</b>	
<hr/>		
<b>Chapter 2</b>	<b>5</b>	
<b>Access Routes and Drainage</b>	<b>5</b>	
<hr/>		
<b>Chapter 3</b>	<b>9</b>	
<b>Masonry</b>	<b>9</b>	
<hr/>		
<b>Chapter 4</b>	<b>17</b>	
<b>Ironwork</b>	<b>17</b>	
<hr/>		
<b>Chapter 5</b>	<b>21</b>	
<b>Trees &amp; Woodland</b>	<b>21</b>	
<hr/>		
<b>Chapter 6</b>	<b>25</b>	
<b>Ornamental Plantings</b>	<b>25</b>	
<hr/>		
<b>Chapter 7</b>	<b>28</b>	
<b>Grasslands</b>	<b>28</b>	
<hr/>		
<b>Chapter 8</b>	<b>29</b>	
<b>Biodiversity</b>	<b>29</b>	
<hr/>		
<b>Chapter 9</b>	<b>31</b>	
<b>Property</b>	<b>31</b>	
<hr/>		
<b>Chapter 10</b>	<b>33</b>	
<b>Furniture &amp; Signs</b>	<b>33</b>	
<hr/>		
<b>Chapter 11</b>	<b>34</b>	
<b>Views &amp; Viewpoints</b>	<b>34</b>	

KEY

 **Site Boundary:**  
Scottish Water land ownership  
boundary

DRUMCLOG GATEWAY

MEASURING  
POND

MUGDOCK RESERVOIR

MEASURING  
POND

CRAIGMADDIE RESERVOIR

**Milngavie Reservoirs Site  
Management Plan**

**Fig. 1 Site Boundary**

Scale 1:3000 @ A1

50 100 150

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KEY

- Inside Scottish Water Ownership
- - - Outside Scottish Water Ownership

**ZONE 1:**  
Mugdock Reservoir

**ZONE 2:**  
Barrachan Wood

**ZONE 3:**  
Barrachan Farm

**ZONE 4:**  
Katrine Water Project

**ZONE 5:**  
Craigmaddie Reservoir

**ZONE 7:**  
Craigash Farm

**ZONE 8:**  
Mugdock Bank

**Milngavie Reservoirs Site Management Plan**

**Fig. 2 Landscape Compartments**

Scale 1:3250 @ A1



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# Chapter 1

## Introduction

### Introduction

**1.1** Victorians considered the supply of clean water to be the cornerstone of a civilised society. Glasgow and other major cities in the UK suffered major outbreaks of Cholera in the middle of the 19th century, which were attributed to polluted water supplies. In 1848 a Public Health Act was passed by Parliament to promote the supply of clean water. At this time schemes were being prepared to provide clean water supplies to all major conurbations throughout the British Isles.

**1.2** Located on the outskirts of Glasgow, the Milngavie Reservoirs represent an outstanding example of Victorian municipal engineering and, as with many feats of engineering from this time, the adventurousness, innovation, and quality of workmanship, are outstanding. The legacy of industrial architecture in masonry and ironwork is exceptional, and the civic pride demonstrated by the treatment of the landscape is equally impressive. The engineering design and construction skills employed to supply Glasgow with clean water from Loch Katrine are awe-inspiring.

**1.3** The eminent engineer John Frederic Bateman selected Loch Katrine as an appropriate source of water for Glasgow and led a team of engineers who translated the scheme into reality by raising the water height at Loch Katrine and constructing a 26-mile-long aqueduct terminating at the Mugdock (storage) Reservoir, completed in 1859 and opened by Queen Victoria. Later that century, chief engineer James Gale deemed that the storage capacity of Loch Katrine should be increased and that a second line of aqueducts and another storage reservoir should be constructed at Craigmaddie above Milngavie.

**1.4** The above historic achievements were followed in the early 21<sup>st</sup> century by completion of the 'Katrine Water Project' which replaced the earlier water treatment facilities with a substantial new development adjacent to Barrachan Farm and to the west of Strathblane Road.

**1.5** In addition to the reservoirs' importance for water supply, their designated landscape has become a vital resource for outdoor recreation and education for the community of Milngavie and for many residents in surrounding areas. It performs as a Country Park complementary to the nearby Mugdock Country Park and receives significant visitation. It is also important for its built and natural heritage attributes.

**1.6** The Milngavie Reservoirs site, which includes the Mugdock and Craigmaddie open waterbodies, together with all associated masonry structures, is Category A listed. This reflects that the site is of "national or international importance. The reservoirs' listed status was awarded by Historic Scotland in 1971 and upgraded from Category B to A in 2008. The designed landscape is also registered within the Inventory of Gardens and Designed Landscapes in Scotland (introduced in 2018). The inventory assesses the significance of the designed landscape against the following criteria:

- Artistic Interest: High
- Historical: Outstanding
- Horticultural: Some
- Architectural: Outstanding
- Archaeological: Some
- Scenic: Outstanding
- Nature Conservation: Some

**1.7** The reservoirs, their water treatment facilities and landscape are owned and managed by Scottish Water whose primary remit for this site is the supply and treatment of drinking water for the Glasgow City Region. Scottish Water's duties fall under Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997, Scottish Water (Milngavie Waterworks) Byelaws 2015 and Water (Scotland) Act 2011. Priorities relate to the operational requirements of the reservoirs and budgets for landscape management and enhancement are limited. Nevertheless, as an important and designated public asset, the landscape demands holistic management and commitments to ensure landscape features and characteristics are safeguarded into the future.

### Background to the Plan

**1.8** LUC has been commissioned by Scottish Water to prepare a Site Management Plan and Maintenance Plan for the landscape of Milngavie Reservoirs in East Dunbartonshire. This follows the adoption in 2019 of a fresh approach by Scottish Water to the management and maintenance of Milngavie Reservoirs. This approach has been informed by consultation with the Milngavie Reservoir Liaison Group (MRLG), the local authority (EDC), Historic Environment Scotland (HES), Friends of Milngavie Reservoirs (FoMR) and with site visitors. Consultation findings in conjunction with Scottish Water's internal reviews recognised that the past priorities had been on health & safety, security, and operational obligations, and that the care of the landscape had declined, resulting in the deterioration of many non-operational attributes and the natural environment. In recent years Scottish Water has invested in the fabric of the site eg ironwork repairs, repairs to gates and valve towers; replacement valve tower bridge. Footpaths upgrades have also recently commenced. There remains however a need to conserve and maintain many other components of the landscape as recognised in Scottish Water's 'Up to Standard Action Plan' which sets out clear objectives for the enhancement of the landscape. An outline 'maintenance plan' has also been prepared as the basis for defining regimes for each component of the landscape following enhancement and repair. These two Scottish Water documents provide the baseline and brief for the preparation of the Site Management Plan and Maintenance Plan.

**1.9** LUC has undertaken previous studies which are relevant to this document. In 2006 the 'Conservation and Recreation Management Plan' was prepared and represented a comprehensive review of the reservoir landscape at the time. The 2006 study prepared a detailed plan for the designed landscape based on best practice for landscape conservation management plans. It was informed by research, site appraisals, community consultation and liaison with the Friends of Milngavie Reservoirs. Subsequently LUC undertook the 'Green Flag Review' in 2018. This set out what would be required to achieve Green Flag Status for the Milngavie Reservoirs' Landscape based on a pre-assessment using the Green Flag criteria.

**1.10** Whilst several years have passed, during which the new Water Treatment works has been completed, much of the baseline information and the conservation objectives set out within the 2006 plan are still relevant. This Landscape Management Plan will consequently not seek to replicate the earlier plan but utilises relevant information and applies a similar structure for consistency. The condition of the landscape and its constituent parts has changed somewhat over the last 17 years, and the scale of the landscape requires that future improvements be undertaken in a prioritised manner working to the resources and budgets available.

### Brief for the Site Management Plan

**1.11** Scottish Water's overarching Site Objective for the Milngavie Reservoirs landscape is defined within the 'Bringing Up to Standard Document' as follows:

- *Scottish Water will work to ensure that the Craigmaddie and Mugdock reservoirs and surrounding Scottish Water land are managed and maintained appropriately to keep them beautiful for the benefit of future generations, guided by feedback from the community.*

**1.12** Implicit within the above objective are more detailed objectives defined by Scottish Water for the main components of the landscape as follows:

- Footpaths, including drainage.
  - *Implement a footpaths refresh, delivering a durable and accessible surface working to address associated drainage concerns to minimise flooding impacts.*
- Landscape
  - *Re-establish site vegetation in accordance with the designed landscape, re-establishing historic vistas, replanting lost trees and minimising levels of invasive species.*
- Biodiversity
  - *Establish means of enhancing biodiversity across the site. Establish areas where vegetation needs to be kept on top of over the long term, focusing on those most visible to visitors, while maintaining habitats for wildlife.*



- Masonry
  - Rejuvenate neglected walls around the site, focusing on those most visible to visitors, addressing areas of degradation.
- Ironworks
  - Address evidence of neglect on site ironworks.
- Property
  - For the property remaining in Scottish Water ownership, we (SW) will determine long term plans for their use, while maintaining them in good condition, delivering any necessarily external upgrades\*.
- Fencing
  - Assess and address any areas of degradation in the essential fencing, ensuring its longevity.
- Other
  - Miscellaneous items will be addressed on a case-by-case basis.

**1.13** The above subjects and their associated objectives have been taken as the basis for the project brief, although there are some limitations in the scope of work as agreed with Scottish Water as follows:

- This plan will not consider potential building development/ reuse options which will be dealt with by separate feasibility work
- Evidence of structural failures relating to buildings and significant reservoir structures and drainage infrastructure will be the subject of separate investigations and technical assessments by SW.
- Proposals for new car parks and associated roads is not included in this project (options were previously addressed in the 2006 plan and some may have relevance)
- Protected species surveys and associated detailed management proposals are not included in this plan but recommendations for future work are included.

## Conservation Considerations

**1.14** This document is intended as a practical guide to the landscape repairs and enhancements required to bring the landscape 'up to standard' as required by SW's brief. The heritage significance of the reservoir landscape and associated structures determines that any enhancement works must be cognisant of potential heritage impacts, and for visitors/ users of the site, the landscape should be accessible and safe. The 2006 Conservation and Recreation Management Plan remains relevant in this regard as it set out the Conservation Philosophy for the site together with conservation and development policies and objectives. In response to a request by the Friends of Milngavie Reservoir, the conservation context has been included within the preamble of this plan. It aims to provide an overarching picture of conservation-management objectives which are reflected in the priorities for actions included in the Action Plan within this document. Future maintenance operations also need to respond to the relative heritage merits of the landscape components and to the visitor demands. The following paragraphs consequently re-state and update the conservation philosophy for the Milngavie Reservoirs landscape.

### Conservation Philosophy

**1.15** The Milngavie Reservoirs are essentially the product of Victorian enterprise undertaken in two seamless phases in 1859 and 1896. The second phase enlarged and carefully integrated new components with the first phase, employing the same methods and quality of engineering construction. It is considered therefore that the reservoir landscape reached its climax in 1896 and the years that followed in the early part of the 20th century. Subsequent developments, although necessary to meet operational demands, had a negative impact on the architectural and landscape design qualities of the site. This determines that the main conservation emphasis within future management works should be the protection, repair/ restoration and enhancement of the landscape and its structures in a way that is sympathetic to the conditions prevalent in 1896-1900. This does not mean slavish restoration of conditions in that period as this would be clearly impractical and could not respond to the contemporary demands of society or the operational constraints of Scottish Water. Furthermore, the future management actions must also respond to the characteristics and uses of each landscape compartment.

**1.16** The influence of the Victorian engineers is all-pervasive within the walled boundaries of the site, but it is possible to identify areas and features which pre-date the reservoirs and retain some of their original agricultural characteristics. These are in the

Barrachan Hill area. The conservation-management activities must therefore respect these characteristics as well as those which relate solely to the reservoirs' construction era.

**1.17** Conservation Plan methodologies, as initiated by James Semple Kerr, require conservation objectives and priorities to respond to the cultural significance of individual features and their context, and to address, as far as possible, the identified threats to the heritage. Implicit in this process is the potential need for new developments, which can help to make the heritage more meaningful and accessible in contemporary society. New development can also secure the future upkeep of historic buildings and landscapes, and if well designed, will become a positive addition to the heritage in future years. Conversely the conservation process also provides an important opportunity to 'undo' mistakes of the past and to remove inappropriate developments. These evolutionary principles allow heritage sites to remain dynamic, albeit within carefully controlled parameters.

**1.18** Public consultation in relation to Milngavie Reservoirs has identified the deep affection held for the reservoirs' landscape by the local community. This has been translated into their aspiration for the protection of the site's special tranquil character, the conservation of its heritage features and the long-term enhancement of its maintenance. These aspirations have recently been revisited by Scottish Water and the 'Bringing Up to Standard Document' together with a range of recent enhancement works demonstrate Scottish Water's commitment to addressing the previous decline in the landscape condition.

**1.19** In the context of this Management-Action Plan it is possible to revisit and update the conservation philosophy for the Milngavie Reservoirs landscape reflecting recent feedback from SW and the Friends of Milngavie Reservoirs. This can be translated into the following key aims:

- to conserve the landscape and its component features in a manner that, first and foremost, respects and preserves the integrity of the Victorian design undertaken in two complementary phases by John Bateman and James Gale
- to conserve the individual positive characteristics of the landscape compartments
- to prioritise conservation-management works according to the heritage value, prominence and accessibility of site features and landscape compartments
- to respond to the threats to the heritage in a prioritised manner, tailored to budget and resource availability
- to seek positive and sensitive new uses for redundant buildings
- to remove redundant structures of no/ low heritage value
- to remove or mitigate the effects of insensitive developments/ interventions from the period 1960 to 2023
- to support appropriate new activities and improve public access around the reservoir landscape in both physical and intellectual terms

### Conservation Policies by Compartment

**1.20** The 2006 Conservation and Recreation Management Plan defined the Milngavie Reservoirs landscape as 9 compartments (**Fig 2**) for which conservation policies were proposed. This framework provides a useful umbrella for management actions and for highlighting the priorities across the site. The Conservation Policies have consequently been reviewed and updated to support this plan.

#### Compartment 1: Mugdock Reservoir

- To conserve and restore the Mugdock Reservoir landscape in a way that respects the design intentions of both John Bateman and James Gale. This compartment contains the oldest components of the reservoir complex and therefore they are likely to be in slightly greater need of attention than those at Craigmaddie. Means of interpreting the combination of both 1859 and 1896 phases of work would also help visitors to appreciate the scale and skill of the work involved (note: new interpretive works ongoing). This compartment is readily accessible, has a high profile and is heavily used by visitors it should, therefore, be conserved and maintained to a high amenity standard. As a priority this includes maintenance of the circular path, and reservoir structures. For the latter it is essential that the revetments are well maintained to preserve their integrity and to prevent views being blocked by self-seeded woody vegetation. Of outstanding value and therefore priority subjects for high maintenance are the architectural elements and their setting associated with the Measuring Pond and Gauge Basins (including the headwall, basin walls & railings, spillways, and causeway) and with the Old Water Works. New recreational activities should be carefully managed and of a type that does not compromise the quiet reflective qualities of the reservoir ( eg additional seating for resting and contemplation).

**Compartment 2: Barrachan Wood**

- To retain and perpetuate the woodland cover of Barrachan Hill, preserving its informal rugged character while accommodating distinctive pockets of ornamental plantings and nature conservation themes according to the local characteristics. To maintain and enhance the existing network of informal paths to allow exploration and wider experiences of the reservoir landscape, including elevated views from Barrachan Hill. This compartment also contains some remnants of the older pre-reservoir landscape in the form of old field walls and lines of veteran trees. Measures should be taken to protect these old features and make them safe.

**Compartment 3: Barrachan Farm**

- To retain and find new sustainable uses for the Barrachan Farm buildings including Barrachan Hall (this has been pursued by SW since 2006 with the intention of finding suitable new uses. The Barrachan complex of buildings is consequently excluded from the Management Plan). Ideally plans for Barrachan Farm will also include conservation of the landscape associated with the buildings, including both the ornamental and former farm landscape features. As a priority within this plan, public access through the Barrachan site should also be restored to allow circulation of Barrachan Hill and access from the Reservoirs to the northern areas of the site including the Barrachan North Loop path (B7)

**Compartment 4: Milngavie Water Treatment Works**

- This area of land is outside the scope of this study and public access is not permitted. However, this compartment is visible from publicly accessible areas of the reservoir landscape and so the condition of its landscape and integrity of its peripheral tree belts, old and new, is important. The significant areas of grassland within this compartment hold potential for biodiversity which could benefit the whole site.

**Compartment 5: Craigmaddie Reservoir**

- To conserve the landscape of the Craigmaddie Reservoir in a way that respects the design intentions of James Gale in 1896 and to accommodate recreational activities and public access in a sensitive manner avoiding negative impacts on heritage features. Like Mugdock Reservoir this compartment is readily accessible, has a high profile and is heavily used by visitors who walk, jog and cycle around its circumference. It should, therefore, be conserved and maintained to a high amenity standard. As a priority this includes maintenance of the circular path, and reservoir structures. For the latter it is essential that the revetments are well maintained to preserve their integrity and to prevent views being blocked by self-seeded woody vegetation. Of outstanding value and therefore priority subjects for high maintenance are the architectural elements and their setting associated with the Measuring Pond and Gauge Basins (including the headwall, basin walls & railings, spillways, and causeway). Recreational activities and public access should be carefully managed and of a type that does not compromise the quiet reflective qualities of the reservoir (eg additional seating for resting and contemplation).

**Compartment 6: Redundant Water Works**

- To find new visitor-related uses for the redundant water treatment buildings. This is the focus of the site and should consequently be the hub of recreational and educational activities from where access and views over both reservoirs can be obtained. The landscape of this compartment should be maintained to the highest order and ideally include the restoration of the lost horticultural interest once synonymous with the site. The removal of redundant chemical storage buildings has allowed the recent development of a new wildlife garden in the southern part of this compartment, but there is a need to enhance other parts of this compartment and to reduce the impact of parked cars. This compartment also contains important architectural features (eg overflow, straining well and associated drawdown tower. These features and their setting should be maintained to a high standard following the recent refurbishment of the structures. Positive uses for the former water works buildings should be investigated to optimise these strategically positioned buildings at the hub of the site. Positive uses should also support the conservation of the heritage assets.

**Compartment 7: Craigash Farm**

- This area of land is outside the scope of this plan and of Scottish Water's ownership; however, it overlooks the site and forms the backcloth to views over Craigmaddie Reservoir. It therefore has a strong visual relationship with it, which should ideally be protected from inappropriate developments. Such protection should be provided through statutory planning controls by the local authority.

**Compartment 8: Mugdock Bank**

- This area of land is also outside the plan boundary and Scottish Water ownership however, it overlooks the site and has a strong visual relationship with it. It is important, therefore, that the rural character and integrity of landscape features are maintained and potentially enhanced through statutory protection measures. Scottish Water should consequently encourage neighbouring landowners to safeguard the landscape which forms the backcloth to the reservoirs.

**Compartment 9: Bankell site**

- This area of land is also outside the scope of the plan but is owned by Scottish Water and incorporates a service reservoir. In relation to this compartment, it will therefore be important to preserve the historic landscape features surrounding the site, in particular Bankell Wood to the north and the Strathblane Road perimeter wall and tree lines.

**Conclusion**

**1.21** The reservoir landscape contains a wealth of heritage interest and provides an outstanding resource for recreation and education. It contains several focus areas of architectural merit and landscape quality linked by an access network that provides sequential views and changing experiences from one part of the landscape to another. Whilst there are features of interest in many locations, there are three key nodes where the quality of the Victorian engineering is exemplified these are at:

- **The Old Water Works** including the Commissioners' Cottage, Straining Wells, Craigmaddie Overflow and the ornamental gardens
- **Mugdock Measuring & Gauge Basins** where the quality of the masonry structures and ironwork, including the sculptural beauty of the gauge basins are complemented by the framework of soft landscape and specimen trees
- **Craigmaddie Measuring & Gauge Basins** where similarly the quality of the masonry structures and ironwork, including the sculptural beauty of the gauge basins are complemented by the enclosure of topography, soft landscape and specimen trees

These three focal points represent key destinations for those visiting and circumnavigating the landscape. They are relatively intimate areas within a large landscape making their impact more concentrated. These areas consequently justify the highest levels of maintenance and priority treatment for future repairs.

**Scope and Format of the Management Plan**

**1.22** The site area is defined in **Fig 1** and is consistent with the area designated by HES within the Inventory of Gardens and Designed Landscapes. This document is intended to define measures needed to repair and enhance the landscape components of the Milngavie Reservoirs within the ownership of Scottish Water. It recognises that the scale of these requirements is significant, but that some issues are more pressing than others, and that some subjects have a higher profile or serve more important functions in the landscape. The large scale of the landscape also determines that the repair of some components will take a considerable time eg several kilometres of boundary walls. Consequently, proposals have been assigned priorities to allow programming and phasing of works over 20 years. The plan identifies priorities and suggested timescales for implementation of works within time bands of 0-5 years; 5-10 years and 10-20 years.

**1.23** This plan is intended as a practical working document and so sets out findings and proposals for each component/ attribute of the landscape. The landscape components listed in the brief have been taken as basis for this plan, but some adjustments have been made to provide consistency with the 2006 plan structure as follows:

- Access Routes & Drainage
- Masonry (incl walls, reservoir structures, gate pillars)
- Ironworks (incl Parapet rails, metal fences, gates, bridges, security and essential fencing)
- Trees & Woodlands
- Ornamental Plantings (shrubs, hedgerows, gardens)
- Grasslands
- Biodiversity
- Property (buildings and monuments)



## Chapter 1

### Introduction

Milngavie Reservoirs Landscape Site Management Plan  
February 2024

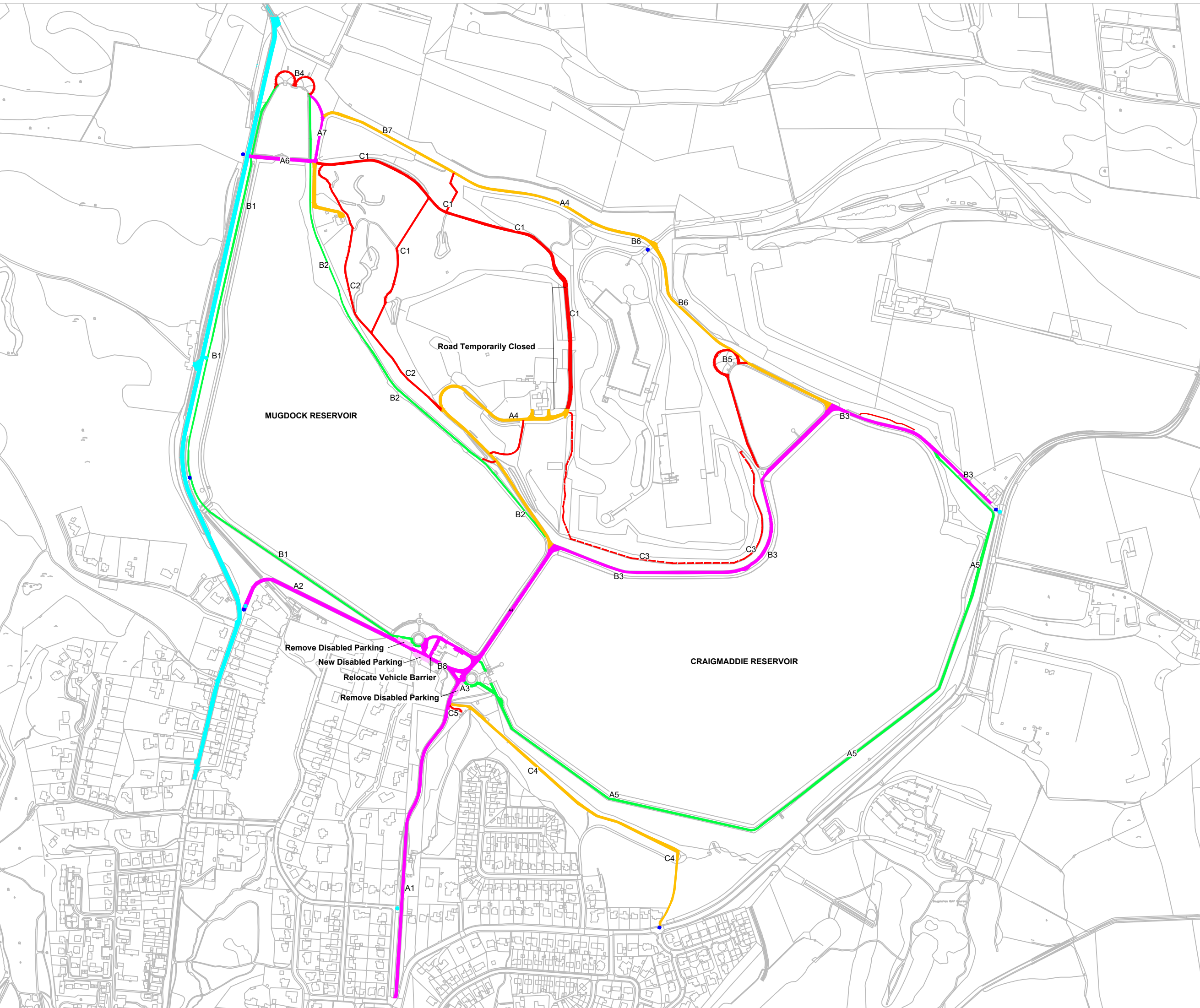
- Furniture & Signs
- Views & Viewpoints
- Summary Action & Cost plan
- Management Structure\*(to be concluded following further discussions with SW)

**1.24** A chapter has been designated to each of the above subjects and this includes:

- a summary of the 2023 site appraisal findings supported by photographs and plans for cross-referencing.
- a general description of the repair / enhancement requirements and assessment of priorities
- a quantified schedule of repair requirements and priorities/ phasing recommendations
- A collated outline cost plan (2023) included within the Action Plan.

KEY

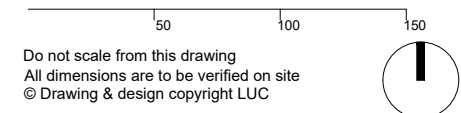
- Restricted Vehicular Gate
- Unmetalled Unedged Path
- Unmetalled Edged Path
- Desire Line Path
- Unmetalled Drive
- Metalled Drive
- Asphalt Road
- Pedestrian Entrance



Milngavie Reservoirs Site Management Plan

Fig. 3 Access Routes

Scale 1:3000 @ A1



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## Chapter 2

### Access Routes and Drainage

#### Introduction

**2.1** The Milngavie Reservoirs landscape has an extensive network of access routes designed to allow circulation of the reservoirs by pedestrians and operational access to the reservoir structures and water treatment infrastructure. The principal routes / roads are metalled while the majority of the footpaths and tracks are unmetalled (aggregate or grass surfaces). Some routes pre-date the reservoirs and relate to the former agricultural landscape. **Fig 3** illustrates the network of present (and lost) access routes, access into the site and indicates the types of hard surfaces present within the reservoirs site.

**2.2** The reservoir landscape operates as a country park and is a popular place for walking, jogging and nature watching. The circuits around the reservoirs are level and ideal for visitors with impaired mobility, although access to the reservoir level involves a climb from Milngavie or use of vehicular transport to gain access to strategic parking facilities at Drumclog or within the former water treatment / Commissioners' Cottage area. The Barrachan Hill area has more rugged topography with inherent constraints to access by those with impaired mobility. However, it provides a more informal 'wilder' character which contributes positively to the overall experience of the site.

#### Entrances

**2.3** The reservoirs site is serviced by several entrances. These accommodate both vehicular and pedestrian access as follows:

- Mugdock Road, opposite Drumclog Car Park: Pedestrian entrance. involves an uncontrolled road crossing next to the car park entrance with minimal pedestrian protection. This area suffers from ponding in the road and despite the 30mph speed limit, the straightness of the road encourages some irresponsible drivers to exceed the speed limit making it a potentially dangerous crossing.
- Mugdock Road, Mugdock Causeway: Pedestrian and vehicular entrance. For pedestrians this involves another uncontrolled road crossing with no footway on the east of Mugdock Road for protection. Vehicular access at this entrance is restricted to Scottish Water and residents of Craigholm.
- Mugdock Road, Water Works ramp: This entrance is defined by a gateway with stone pillars and ornamental iron gates at the bottom of the ramp leading from Mugdock Road to the old water works. It is shared by vehicles and pedestrians and is the main route to disabled parking facilities in the water works area.
- Tannoch Drive: An ornamental iron gate provides access through the Tannoch Drive boundary wall to Commissioners' Walk via a short, narrow ramp surfaced in uneven black top. A corresponding gap in the Commissioners' Walk wall allows access onto the Walk.
- Strathblane Road, Craigmaddie Lodge entrance: this gateway is framed by stone pillars and railings and can also accommodate vehicular traffic to the lodge house and into the site. A side gate in the railings provides a separate pedestrian entrance and this has recently been cleared of vegetation to restore pedestrian access.
- Strathblane Road, Commissioners' Walk entrance gates (closed): This represents the principal entrance to the reservoirs as originally intended. The entrance to Commissioners' Walk is at the junction of Moor Road with Strathblane Road and is defined by a gateway where ornamental iron gates are framed by stone pillars with connecting walls. There is a 4.3m clear opening between the main gate pillars and these support ornamental iron gates in two leaves: a pedestrian gate and a vehicular gate. These gates are closed to both pedestrian and vehicular access, although the pedestrian gate could be utilised on its own if adequate safety measures were introduced to allow pedestrians egress and ingress across the Moor Road junction.
- Mugdock Road/ near the overflow: this gate is closed to both vehicles and pedestrians.
- Roselea Drive, off Strathblane Road: vehicular access into the area below Craigmaddie Reservoir is possible from Roselea Drive. It provides access for maintenance and construction works by Scottish Water and is not promoted or used for access by the general public.
- Strathblane Road access road to the (new) Water Treatment Facilities: development of the water treatment works in 2006-2008 included the development of a new access road from Strathblane Road to the development site to the north of Craigmaddie

Reservoir. The junction with Strathblane Road has traffic lights for use when needed, but they are generally not in operation. This route primarily serves Scottish Water operations, but it also provides a convenient route to for the public to the area north of Craigmaddie Reservoir where there are connections with the path network. Consequently, a small number of visitors use this route and park on private land outside the Milngavie Water Treatment Works area.

#### Entrances: Management Actions

**2.4** Well used pedestrian entrances on Mugdock Road involve uncontrolled pedestrian crossings on a straight road where from observation, traffic speeds by inconsiderate drivers are frequently above the speed limit. This creates a potentially dangerous situation especially for visitors who are elderly, have children or are walking dogs. Traffic calming measures are consequently recommended along Mugdock Road and especially at the Drumclog car park and Mugdock Causeway entrances. Such measures would be outside the ownership of Scottish Water, but it is in Scottish Water's interest to ensure entrances to their site are safe. Liaison with the Roads Authority is consequently recommended to seek road safety improvements at this entrance to the site. It is acknowledged that some road markings are present, but these warrant review by the local roads' authority. The Use of road overlays to deter speeding combined with raised tables should be considered for these entrances together with improved signage to denote "Pedestrian Crossing". Such measures will require to be agreed with (and possibly implemented by) the local roads' authority, East Dunbartonshire Council.

**2.5** Re-opening of the pedestrian gate at the foot of Commissioners' Walk would improve the visitor experience and bring back into use the principal site entrance for pedestrians. This could be achieved whilst maintaining restrictions to vehicular access at this gate. However pedestrian access across the adjacent public road would require some local amendments to footway connections and road crossings to provide a safe environment for pedestrians. Such measures would be the responsibility of the local roads' authority. If the latter could not be implemented, then it would be safer to keep the gates closed.

#### Parking

**2.6** Drumclog Car Park provides 45 nr. car parking spaces. The entrance to the car park has a height restriction and ground mounted metal plates to enable managed access and egress. The car park is owned and managed by East Dunbartonshire Council. It serves visitors to the Milngavie Reservoirs and to local paths linking with Mugdock Country Park and the West Highland Way. The Drumclog Car Park is open 24/7 and it is a well-used facility for access to the Reservoirs and to connecting paths from the north and west.

**2.7** The decommissioned Water Works site provides 11 nr. parking spaces in two bays (8 disabled bays and 3 standard bays designated to SW use). These spaces are designated for disabled drivers and for Scottish Water employees. There are consequently no parking spaces for general visitors inside the reservoir landscape. However, use of the disabled spaces by the general public has been witnessed on several occasions suggesting that restrictions to vehicular access are not entirely successful. The Drumclog Car Park is frequently full, and this encourages the illicit use of the disabled spaces in the old water treatment works area. Vehicular traffic up the Mugdock Reservoir ramp is consequently significant and impacts negatively on pedestrians using this ramp and visiting the reservoirs.

**2.8** The location of the parking bays within the old water treatment works area is also intrusive on the designed landscape. The rank of parallel disabled parking to the west of the Commissioners' Cottage occupies an area directly in line with the main pedestrian access route around the reservoirs ie it severs the pedestrian route to and from the Mugdock Reservoir dam above Tannoch Loch. The larger rank of disabled and Scottish Water parking bays is located inside the gate at the head of Commissioners' Walk and consequently brings vehicles into an area of focussed pedestrian activity.

#### Parking: Management Actions

**2.9** Consideration of new car parks and parking amendments is not within the brief for this management plan, but inevitably parking provisions have an impact on visitor movements and safety. Whilst it is recognised that visitors should be encouraged to walk and cycle ie use active travel rather than cars, there remain demands for parking from a range of users. This includes the need to provide appropriate access for the disabled and less mobile visitors. The disabled parking spaces within the decommissioned water works area

are consequently a valuable facility although there is scope to improve their environment and it would be beneficial to reinforce parking restrictions for general visitors within the core area of the reservoir landscape. It is recognised that the future development of redundant buildings and enhancements to the reservoir landscape could bring further demands for parking and servicing. In such scenarios Scottish Water intend to examine parking management as part of future development feasibility studies. Where the issues relate to roads and land outside Scottish Water's ownership, this will require liaison with the local authority or with private landowners. There remain some enhancements that could be undertaken as part of the management actions these are outlined below.

- Removal of the disabled parking area to the west of Commissioners' Cottage is proposed to allow improvements the pedestrian link to/ from the main reservoir circuit path along the top of the Mugdock Reservoir dam. This would also involve reinstatement of the path around the Straining Well and crown lifting of the overhanging conifer to remove obstructions.
- Removal and relocation of the larger disabled and Scottish Water parking area to the west of the Commissioners' Cottage vehicle barrier, on the south side of the main access road, occupying the area of the redundant road junction /hammerhead. This area would accommodate 8nr perpendicular disabled parking spaces.
- Cycle parking facilities are needed within the car parks and the visitor hub areas. Key sites are:
  - The old Water Works area
  - Drumclog Car park (action required by East Dunbartonshire Council, potential liaison with Scottish Water to discuss how EDC could assist in managing access to the Reservoir Landscape)

## Access Routes: overview

**2.10** The Milngavie Reservoirs landscape has an extensive network of access routes which comprise:

- Metalled roads and associated footways (asphalt/ bitumen macadam) providing the main operational access routes for vehicles to buildings and infrastructure.
- Unmetalled (crushed aggregate) tracks and paths providing access for operational purposes and for visitor circulation of the site.
- Informal / unmetalled paths providing access routes along old/ unmaintained tracks and along 'desire-lines' worn by visitors. Most of these routes are within the Barrachan Hill area and include routes which have grassed over, or which become muddy when trafficked in wet conditions. Several of these negotiate irregular topography, contrasting with the level routes around the reservoir perimeters.

**2.11** Scottish Water is currently undertaking an extensive upgrade of the unmetalled paths which will introduce a new surface using recycled aggregates and which will address drainage issues along the routes. This treatment will substantially enhance the access network for visitors (and for operational/ maintenance by Scottish Water). Several informal routes and desire line paths are not currently scheduled for resurfacing, and these would require a range of minor enhancement works to make them safer and more useable.

**2.12** The metalled/ asphalt roads are mostly in good condition and do not require substantial upgrades, although ongoing maintenance and localised repairs will be required.

**2.13** Scottish Water is currently releasing the Barrachan Farm plot and buildings for development and planning consent has been granted for new access developments to provide a vehicular route from Mugdock Road around the north side of Barrachan Hill. This route will partially follow pre-existing tracks.

## Road / Path conditions

**2.14** The imminent enhancement of access routes determines that this plan does not require to assess the needs of the routes scheduled for imminent improvement. The following paragraphs consequently concentrate on routes outwith Scottish Water's current programme and provide a summary description of the routes as defined in **Fig 3**.

## Metalled Roads

**2.15** The asphalt surfaced routes within the site are described in summary below. These are used as the primary routes for Scottish Water access, and also provide vehicular routes for visitor use with an emphasis on disabled visitor access.

- A1: Commissioner's Walk
- A2: Mugdock Reservoir ramp
- A3: Old Water Works roads & parking areas
- A4: Main Causeway
- A5: Craigmaddie Reservoir north & measuring basin causeway.
- A6: Mugdock Reservoir / measuring basin causeway
- A7: Barrachan access road
- A8: New Craigmaddie Lodge access road
- A9: New Water Works Access Road

### Commissioner's Walk (A1)

**2.16** Commissioner's Walk comprises a metalled road 3.7m wide bounded by a clipped hedge on its eastern side, and a 1.2m footway on its western side. A low stone wall runs part-way adjacent to the footway with a gap to access the Tannoch Drive side gate. The footway has a 100mm concrete kerb upstand and terminates at the western gate pillar at the foot of the Walk. Vehicular access is currently limited to Scottish Water operations and associated agents. The absence of traffic on the lower section of the road and footway has allowed the growth of moss and algae. The asphalt surface is however in sound condition with no obvious remedial requirements.

### Mugdock Reservoir Ramp (A2)

**2.17** The Mugdock Reservoir ramp leads from the gateway on Mugdock Road to the old water works area at the higher level. The ramp comprises a straight metalled road c. 3.5m wide with no footways. This has a relatively steep gradient and is framed by stone walls on both sides. It represents some potential risks to pedestrians given the limited width of the road. The gradient of the ramp is also a constraint to visitors with limited mobility. The top of the ramp is defined by two ashlar sections of walling which terminate the walled approach on this route. The ramp surface is intact but has localised wear and extensive cracking along its length. This will inevitably deteriorate with time, likely requiring remedial work within the next 5 years (likely to be required within the next 2-3 years).

### Old Water Works roads & parking areas (A3)

**2.18** Inside the Commissioner's Walk upper gate and the at the top of the Mugdock Reservoir ramp, metalled road access continues to the old Water Works and Commissioner's cottage area. It leads to the main causeway and connects with yard space associated with the old water works. Parking areas have been introduced into this area in the form of bays cut out of the previous soft landscape framework. The road surfaces are asphalt and have concrete upstand kerbs. These are in sound condition.

### Main Causeway (A4)

**2.19** The main causeway between the Mugdock and Craigmaddie Reservoirs comprises a metalled road with kerbed footway on its western side. It connects with the decommissioned Water works area and with roads leading around the north side of the reservoirs (ie to Barrachan and to the Craigmaddie Measuring basin causeway). This road is framed by walls along the length of the causeway. The road surface is asphalt in sound condition. The footway is of rougher blacktop construction and appears to be little trafficked.

### Craigmaddie Reservoir north & east (A5)

**2.20** The metalled road continues from the Main causeway around the north side of Craigmaddie Reservoir, linking with the measuring basin causeway and the road from the Craigmaddie Lodge gateway on Strathblane Road. It is surfaced in asphalt and in sound condition. The Craigmaddie Measuring Basin causeway has a metalled road with kerbed footway on its north-western side. These surfaces are in sound condition. Vehicular control gates inside the Strathblane Road entrance prevent illicit access into the heart of the reservoir landscape.



### Mugdock Reservoir / measuring basin causeway (A6)

**2.21** The Mugdock Reservoir measuring basin causeway is c. 4m wide and framed by stone walls with ornamental iron parapets. Essential fences also line this route. The road has no footways and is surfaced in asphalt up to the gateways on the eastern side of the causeway, from where the routes become more informal. These asphalt surfaces are in sound condition although there is evidence of cracking along the line of wheel tracks. Vegetation is becoming established at the edges of the road where the fences prevent overrun and maintenance access.

### Barrachan access road (A7)

**2.22** A metalled road extends westwards from the north end of the main causeway following the northern bank of Mugdock Reservoir before climbing Barrachan Hill. The road climbs up to the former Barrachan Farm complex where the asphalt surface stops. From this point the former road route is unmetalled and continues around the eastern side of the hill as B7.

### Craigmaddie Lodge Access Road (A8)

**2.23** A metalled road extends westwards from the Craigmaddie Lodge gateway towards the Craigmaddie Measuring Basin. It is joined by the unmetalled reservoir loop path before continuing along the side of the measuring basin. It then connects with the unmetalled track leading to the north gate near the Water Treatment Works. This road is in sound condition although its edges are overgrown in places.

### Water Treatment Works Access Road (A9)

**2.24** A wide metalled road extends westwards from the junction with Strathblane Road. It runs along a shallow valley and provides vehicular access for Scottish Water to the Water Treatment Works. This road is not owned by Scottish Water, but they have right of access. It is also used by a number of visitors who park on private land close to the north gate then enter the reservoir landscape. The road is in sound condition.

### Metalled Roads: management actions

**2.25** The metalled roads are mostly in sound condition without severe potholing or cracking. However, several roads show signs of deterioration in the form of fine cracking and wear along the line of wheel tracks. Future deterioration exacerbated by heavy rain and possible freezing conditions will likely result in a need for remedial work over the next 5 years. Where the surface has extensive failures, this will warrant road planing and resurfacing over a large area. For localised failures and areas of disruption by excavations or construction traffic, remedial works with localised patching may suffice. In the case of the latter, it is recommended that patches extend across the width of the roads to provide a more robust repair.

## Unmetalled Roads and Paths

**2.26** The unmetalled roads and paths represent important routes for pedestrian access within the reservoir landscape. They are surfaced in crushed aggregate and vary in width from c. 1m to 3m. The audit has identified the following unmetalled routes as shown on **Fig.2**. These are as follows:

### Mugdock Reservoir Loop (B1)

**2.27** This 1.5m wide path extends from the Mugdock Reservoir Causeway to the top of the Mugdock Reservoir Ramp / old Water Works area. It passes around the south and west sides of Mugdock Reservoir running along the top of the dam then passing through a grassed corridor on the western side of the reservoir landscape. The latter has serious ponding/ waterlogging problems and generally the aggregate surface and timber edgings are worn. This path is due to be upgraded imminently.

### Lovers Walk (B2)

**2.28** Lovers' Walk extends from the eastern end of the Mugdock Reservoir Causeway to the bottom of the Barrachan access road (A7). It is 1.5 m wide with a stone wall on its southern / reservoir side. To the north the ground rises steeply with some outcropping rocks. The path is worn and is frequently waterlogged given the absence of drains and confinement of the wall which limits runoff towards the reservoir (the provision of drains through the wall could alleviate this problem). Close to the junction with the Barrachan Access road a narrow path with stone steps at the base connects Lovers Walk with the Barrachan Road ramp. This narrow path required remedial work which has been completed during the writing of this plan.

### Craigmaddie Reservoir Loop (B3)

**2.29** This path extends from the eastern side of the old Water Works area along the south and east sides of Craigmaddie Reservoir. It forms part of a well-used loop around the reservoir and connects with the metalled road on the eastern side of Craigmaddie Reservoir. It runs along the top of the Craigmaddie before crossing a level grassed area. The route also suffers ponding/ waterlogging problems, its flat levels impeding effective surface water runoff. This path is due to be upgraded imminently.

### Mugdock Measuring & Gauge Basin Paths (B4)

**2.30** The perimeters of the Mugdock Measuring and Gauge Basins are followed by unmetalled paths which allow views over the basins and access behind the head wall of the basin from where elevated views are possible. The Measuring Basin paths are c. 1m wide and have an aggregate surface but were partially overgrown from both sides. Paths around the Gauge Basins lead to the Headwalls, but these are less trafficked and had become overgrown with grass and scrub vegetation which detracted from the architectural qualities of the basin. This path continues behind the Headwall where it climbs steeply. At each end of the headwall path are stone steps. Above the steps, the path was narrow, overgrown, and slippery. This path has recently been upgraded.

### Craigmaddie Measuring & Gauge Basin Paths (B5)

**2.31** The perimeters of the Craigmaddie Measuring and Gauge Basins are followed by unmetalled paths which allow views over the basins and access behind the head wall of the basin from where elevated views are possible. The Measuring Basin paths are c. 1.2m wide and partially overgrown. On the north-eastern side of the basin mature rhododendrons and self-seeded trees create a dense barrier limiting views of the basin and encroaching onto the path. On the western side of the basin views are less obstructed by shrubs although the aggregate path is partially overgrown with grass. Shrubs and scrub vegetation on the west side of the path is encroaching but has been cut back to maintain unobstructed access.

**2.32** Paths around the Gauge Basins had become overgrown with little evidence of the original aggregate path visible. To the west of the Gauge Basins the path was heavily overgrown making access to the Headwall difficult and obscuring the ashlar copes to the Gauge Basin wall. On the north-eastern side, the path is grass and more regularly trafficked. As at Mugdock there are stone steps at each side of the headwall. Above the steps, the path is narrow and at the time of writing was overgrown and slippery. This path has now been upgraded.

### Craigmaddie Reservoir North Access (B6)

**2.33** This path extends from the eastern side of the Measuring Basin to the entrance at the north-eastern edge of the site. It provides access for visitors who use the new Water Treatment Works Road and who follow a circuit around the north of Barrachan Hill. This route is c. 2m wide with localised drainage problems.

### Barrachan North Loop (B7)

**2.34** This track (c. 2.5m wide) extends from the eastern side of the Mugdock Measuring Basin, passing the Dirty Dam before continuing around the northern and eastern edges of Barrachan Hill. Part of this route has recently been upgraded during works to the Dirty Dam. A planning application has also been lodged to upgrade the connecting route to Barrachan Farm to enable development of this derelict complex. This route has recently been closed to public access while works to the Dirty Dam have been ongoing. It has now been upgraded and reopened.

### Water Works paths (B8)

**2.35** The decommissioned Water works area has a network of aggregate paths that passes through garden areas and provide access to the Straining Wells and to the public toilets. These paths are surfaced in both gravel and crushed aggregate. The new biodiversity garden also has a network of paths surfaced in a recycled aggregate material. Most of the paths in this area are c. 1m wide with grass edges. Security fence interventions c. 2006 prevent access along some paths, and bollards have also been introduced to prevent vehicular access along the paths.

### Unmetalled routes: management actions

**2.36** Most of the unmetalled routes listed above are scheduled for resurfacing and drainage improvements by Scottish Water. This programme of enhancements is currently scheduled to adjust crossfalls to assist runoff/ prevent ponding. New path construction using a recycled aggregate surface will then be introduced. These works will substantially improve the condition of the access network and

improve accessibility for all users. Thereafter maintenance work will be required to clear leaves and prevent the encroachment of vegetation. Drains associated with paths (and through adjacent walls) will also require regular clearance to prevent ponding.

### Informal Routes

**2.37** In addition to the unmetalled roads and paths there are numerous informal routes which are unsurfaced, some of which are 'desire-lines'. These routes are generally less accessible due to the gradients and ground conditions. However, they provide a valuable alternative for those who want to explore and experience the less visited parts of the landscape. Some routes may involve health & safety risks due to gradients etc. and consequently upgrades should be focussed on the most well used routes. Appropriate information on the potential access risks and constraints should be provided on site information signs. The audit has identified the following informal routes as shown on **Fig 3**. These are as follows:

#### Barrachan North (C1)

**2.38** Former access route to Barrachan which is metalled but overgrown. It passes through woodland and glades on the north side of Barrachan Hill with old connections to quarries and for farm activities.

#### Barrachan South (C2)

**2.39** An informal route that runs along the top of the embankment and rock outcrops above Lovers Walk. It connects the Craigholm House area with the Barrachan access road.

#### Barrachan South-East (C3)

**2.40** A desire-line path that runs through the former field to the south-east of Barrachan Farm then follows the top of the embankment above Craigmaddie Reservoir. This informal route eventually connects with paths at the Craigmaddie Measuring Basin.

#### Lower Craigmaddie Link (C4)

**2.41** An informal route that runs parallel to a field wall below the Craigmaddie Dam. This route leads from Strathblane Road to the toilet block and old Water Works area. It is a grass surfaced route but has recently been used for construction traffic. Running boards were used to protect the grass surface.

#### Commissioners Walk Woodland Path (C5)

**2.42** An informal route that runs from Commissioners Walk to the toilet block and Craigmaddie Reservoir. It passes through woodland and a grass corridor between the reservoir landscape perimeter and the adjacent housing.

#### Informal routes: Management Actions





**2.43** We recommend that the use and condition of informal routes be monitored to determine whether they can be retained as unsurfaced/ grass paths or whether footfall creates erosion/ ponding problems. Simple interventions to improve the route ground conditions and to remove obstacles (such as fallen trees and broken fences) should be undertaken. Low branches and deadwood overhanging paths should ideally be removed for access and safety reasons. Repair of historic structures close to these routes should also be undertaken where it can improve the safety and amenity of the routes. Eg repair of old field walls.

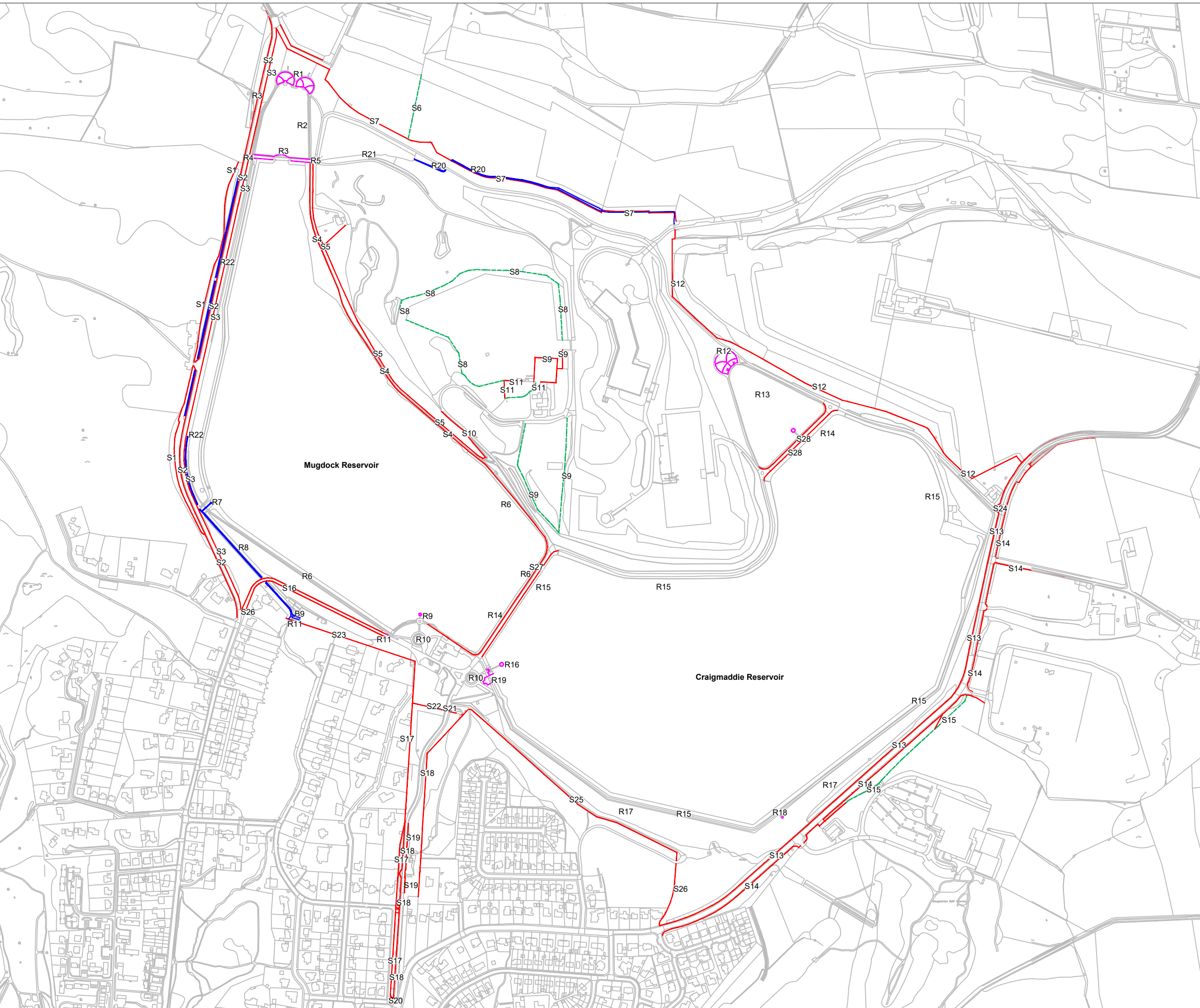
**2.44** If informal routes become well used, then upgrades using crushed aggregate or recycled aggregate surfacing should be considered. Such upgrades should aim to preserve the informal character of the routes and should be approved by East Dunbartonshire Council in consultation with Historic Environment Scotland under the terms of the listing ie Listed Building Consent may be required for significant levels of path upgrade.

**2.45** Visitor information signs should illustrate the path network and describe the condition, gradients and any access constraints. This should make visitors aware of any potential risks associated with the ground conditions.



KEY

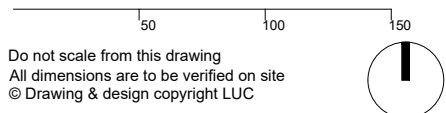
-  Ashlar Masonry Walls and Copes
-  Stone Rubble Wall
-  Stone Wall in Ruins
-  Stone Lined Drainage Channel



Milngavie Reservoirs Site Management Plan

Fig. 4 Masonry

Scale 1:3000 @ A1



Do not scale from this drawing  
All dimensions are to be verified on site  
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# Chapter 3

## Masonry

### Overview

**3.1** The reservoirs structures component of this section addresses the following masonry structures as identified in **Fig 4**:

- R1 Mugdock Reservoir Gauge Basins
- R2 Mugdock Measuring Pond
- R3 Mugdock Causeway
- R4 Mugdock Causeway entrance gateways
- R5 Mugdock Causeway, East Pedestrian Gate Pillars
- R6 Mugdock Reservoir revetments
- R7 Mugdock Reservoir overflow
- R8 Mugdock masonry rill
- R9 Mugdock Reservoir Draw Down Tower
- R10 Mugdock Reservoir Straining Well
- R11 Mugdock Masonry Header Walls
- R12 Craigmaddie Gauge Basin
- R13 Craigmaddie Measuring Pond
- R14 Craigmaddie Causeway
- R15 Craigmaddie Reservoir revetments
- R16 Craigmaddie Reservoir Draw Down Tower
- R17 Dam
- R18 Craigmaddie Draw Off Tower
- R19 Craigmaddie Reservoir overflow
- R20 Dirty Dam feeder swale
- R21 Dirty Dam Outfall
- R22 Dirty Dam swale

### Reservoir Structures

#### Mugdock Reservoir Gauge Basins (R1)

**3.2** Originally, there was a single gauge basin, the westernmost basin, feeding a clean water supply into Mugdock Reservoir. This is illustrated in historical photographs and accounts for the asymmetrical relationship on plan between the two gauge basins. Although a later addition, the detailing of the masonry associated with the second gauge basin is indistinguishable from the first. The individual gauge basins consist of curved masonry header walls with centrally located Florentine arch apertures which discharge water from the Loch Katrine aqueducts. The walls are surmounted by a continuous ashlar stone saddle cope, which accommodates the radius as well as the change in level. The wall ends in two fine ashlar pillars. The radius header wall comprises squared ashlar blocks brought to courses. The curved masonry walls which segregate the gauge basins into three compartments are also constructed in ashlar, with rectangular apertures to allow the passage of water between compartments. The curved perimeter retaining masonry walls of

the gauge basins mirror the internal compartment walls in construction and are surmounted with cast iron posts and wrought iron rails. The weir bridges comprise iron beams infilled with concrete. These originally had timber decks.

**3.3** Located to the north of the gauge basins are three formal staircase entrances to access the aqueduct tunnels. These entrances typically consist of ashlar masonry structures with a cast iron balustrade with rounded top, middle and bottom rails.

**3.4** A dished stone drainage channel is located around the outer edge of the perimeter path to the gauge basins. It consists of both radius and straight lengths of stone and terminates in a dished rectangular end stone, which would have originally housed a cast iron grate.

#### Mugdock Reservoir Gauge Basins : Management Actions

**3.5** Recommended remedial action includes the removal of vegetation, typically mosses and ferns, growing in the joints of the masonry structures.

**3.6** The entrances into the aqueducts are structurally intact, however the treads to the stone steps are slippery and should be cleaned. The metalwork is intact and should receive the same paint finish as the surrounding metalwork.

**3.7** Vegetation should be removed from the dished channels and the missing grate reinstated into the end stone.

#### Mugdock Measuring Pond (R2)

**3.8** The perimeter revetments to Mugdock measuring pond are constructed in random rubble at a gradient of approximately 1:2. The top section of the revetment, above the water line, has been colonised by grasses and self-seeded tree saplings. The causeway which discharges into the measuring pond, known as 'Mugdock Falls' consists of 4 nr. stepped weirs separated by raking ashlar masonry retaining structures jointed with Lime mortar. The large masonry blocks, which comprise the steps are robust and functional. A metal strap fence defines the perimeter of the measuring pond as described under Ironwork.

#### Mugdock Measuring Pond: Management Actions

**3.9** As is the instance with the gauge basin, vegetation should be removed from the joints of the masonry structures. The stone revetments are largely sound; however, some stones have worked free and should be reinserted into their original locations. The colonisation of the upper revetment by grasses does not appear problematic, however, the self-seeded Hawthorn and Birch saplings are potentially damaging to the structure and should be removed.

#### Mugdock Causeway (R3)

**3.10** The causeway separating the measuring pond from the reservoir body is a masonry structure with a central viaduct section comprising three arches which regulate the passage of water between the two open waterbodies. The causeway measures 3 metres in width and is flanked on either side by splayed masonry walls which measure 1 metre in height on the inner face. The masonry walls are topped by a saddle cope stone 450mm in width, with a 35mm overhang on both sides. The cope lengths vary, but average 800mm in length. The masonry walls are built off a plinth course and are constructed from rough-hewn squared stone which has been brought to 4 nr. courses. The walls are omitted over the viaduct, where the cast iron post and rail fence detail is used. The latter permit views across the reservoir and the gauge basin. However, the introduction of high fences in 2003 to both sides of the causeway now detract from this vantage point.

#### Mugdock Causeway: Management actions

**3.11** Generally, the masonry walls require the repointing of lime mortar to the joints between the saddle cope stones and some minor repointing to the joints between the stone courses. The first cope to the south-east wall is displaced and requires to be realigned. There are several self-seeded tree saplings which have become established in the joints along the length of the south-west wall which must be removed to prevent localised displacement of the structure.



**Mugdock Causeway, Road Entrance Gateway and West Side Gates (R4)**

**3.12** The causeway entrance from Mugdock Road is defined by masonry gate pillars with a pair of wrought iron gates. The stone gate pillars, including the capping piece, consist of rough-hewn squared sandstone brought to courses. The pillars measure 620mm square, the capping piece measures 250mm in height and 750mm square. The pillars stand 1.8 metres above ground level. The perimeter wall splays to accommodate the entrance, which is set back from the road.

**3.13** Just inside the Mugdock Road Entrance are side gates to the perimeter footpath. These entrances on the east and west sides of the measuring pond causeway were originally designed to be symmetrical: each footpath accessed between monolithic stone pillars with curved stone caps. These are hewn from single pieces of stone into a tapering pillar which measures 450mm square at the top and 550mm around the base. The pillar has an overall height of 1.65m above ground level. One of the gate pillars to the side gate at the south-west corner of the gauge basin had been removed in c.1970 but has recently been restored together with a connecting panel of rubble walling. To the south of the causeway inside the main gate, it appears that a matching set of monolithic gate pillars were removed some time ago to widen the access to the main pedestrian path inside the perimeter wall. At the eastern end of the causeway the two sets of monolithic stone pillars remain as gateways to footpaths around the measuring basin and onto Lovers' Walk. Both sets of gateways have lost their original iron gates.

**Mugdock Causeway, Mugdock Road Entrance Gates: Management actions**

**3.14** The existing masonry gate pillars are intact and do not require any remedial work. The recent reinstatement of the south-west side gate pillar and complementary repointing of the adjoining rubble walls and pillars has enhanced this gateway. The potential reinstatement of lost monolithic pillars on the south side of the causeway gate would further enhance this entrance but would require accommodating the pedestrian path width.

**Mugdock Causeway, East Pedestrian Gate Pillars (R5)**

**3.15** Two pairs of monolithic sandstone gate pillars close the perimeter path network at the east end of the causeway. Again, these pillars have been hewn from single pieces of sandstone, they are tapered with a curved top profile and display a fine picked chiselled finish. Both pairs of stones have hanging brackets and cast-iron stopping plates embedded into the pillars to receive the lost gates.

**Mugdock Causeway, East Pedestrian Gate Pillars: Management actions**

**3.16** The pairs of gate pillars are structurally intact and require no remedial work. There is no strong case to restore the lost iron side gates as this would potentially restrict public access and introduce unnecessary management complications.

**Mugdock Reservoir Revetments (R6)**

**3.17** The revetments to the reservoir match those of the measuring pond, however, they are substantially larger in scale, measuring between 10-20 metres in width. They are constructed of rough-hewn whinstone blocks laid at an even gradient of approximately 1 in 2. Self-seeded vegetation is growing from joints within the revetment and if left will cause damage to the revetment structure and block views from the perimeter footpaths.

**Mugdock Reservoir Revetments: Management actions**

**3.18** Whilst structurally intact, the revetments need localised repair. Where stones have become loosened or plucked from the revetment face. These require to be reset. Self-seeded woody vegetation should be removed (eg birch, willow and ash) but moss and softer low-growing herbaceous vegetation could be retained for its biodiversity value.

**Mugdock Reservoir Overflow (R7)**

**3.19** The open water body has an overflow outlet which is located along the south-west bank. The floor of the overflow measures 10 metres wide and 20 metres in length, (200m<sup>2</sup>) and is constructed in ashlar masonry with simple manual sluice gates. The reservoir overflow ties into the adjacent masonry rill which carries the water from the Dirty Dam, eventually feeding into Tannoch Loch. The perimeter path crosses the overflow via a bridge span of 10 metres comprising iron beams on masonry piers with iron post and guard rails, replicating the structures of the gauge basins.

**Mugdock Reservoir Overflow: Management actions**

**3.20** Whilst structurally sound, the masonry floor of the overflow is covered by a layer of moss and grasses which should ideally be removed to allow the repointing of defective joints with lime mortar. Some self-seeded woody growth is also becoming established in the overflow walls and this requires removal.

**Mugdock Masonry Rill (R8)**

**3.21** A U-shaped masonry-lined channel runs along the base of the dam carrying water from the Dirty Dam into Tannoch Loch. (The Dirty Dam is so called as it settles silt within runoff from the adjacent fields). The sides and base of the rill are constructed in ashlar masonry with a fine picked chiselled finish, the capping stones are squared, in various lengths with a rough-hewn finish. The lower section of the channel runs at a continuous fall along its 200-metre length next to the dam. Recent works have cleared the vegetation along the lower section of the Rill (adjacent to the dam) but the channel's higher-level route parallel to Mugdock Road is partially overgrown with shrubs and self-seeded vegetation making it difficult to determine the condition of the masonry channel.

**Mugdock Masonry Rill: Management actions**

**3.22** The lower section of the rill appears to be in sound condition with no evident requirement for remedial work at present. At the higher level the channel requires the clearance of invasive and overhanging vegetation to allow inspection of the masonry. The latter should determine requirements for repairs.

**Mugdock Reservoir Draw Down Tower (R9)**

**3.23** The draw down tower is in the open water body 35 metres from the straining well. It comprises a round tower constructed in squared masonry with a rough-hewn finish. The capping layer is constructed from dressed ashlar masonry and is surmounted by cast iron bollards with horizontal rails. The bridge section spanning between the tower and the bank is constructed from iron beams with a lattice parapet, handrail, and parallel swan necks to give structural stability.

**Mugdock Reservoir Draw Down Tower: Management actions**

**3.24** Due to access restrictions imposed by Scottish Water, it was not possible to gain access onto the draw-down tower to assess its conservation needs. It is understood however from Scottish Water's last inspection that the ironwork requires repairs and refurbishment.

**Mugdock and Craigmaddie Reservoir Straining Wells (R10)**

**3.25** The Straining Wells are part of the original water cleansing process. Only the roof is visible above ground. This is constructed from interlocking cast iron and glass panels. The well measures 15 metres in diameter and is 50 metres deep. The walls were filled with sand and used to filter out deposits as water passed down the well. This principle removed impurities from Glasgow's water supply for 150 years. A matching Straining Well also cleans water from Craigmaddie Reservoir. The Straining Wells are due for a detailed inspection by Scottish Water and this will determine any requirements for further remedial works.

**Mugdock and Craigmaddie Reservoir Straining Wells: Management actions**

**3.26** Due to access restrictions, it was not possible to inspect the roof of the straining well up close, however, this well was repainted a few years ago and so limited degradation has occurred since. Scottish Water undertook paint scrape analysis to determine the original paint colours for reservoir metalwork, and on this basis the light grey colour was approved by East Dunbartonshire Council in conjunction with Historic Environment Scotland for use on reservoir ironwork. Due to the listed status of the structures, the Straining Wells are to remain in situ and Scottish Water has an obligation to preserve their integrity.

**Mugdock Masonry Header Walls (R11)**

**3.27** There are two masonry retaining structures associated with the piped outfalls from the straining wells which run parallel with the south boundary and feed into Tannoch Loch. The first is a three-sided structure at the foot of an embankment. The walls are constructed in ashlar masonry with concrete cope stones. The second has two apertures which allow water to flow into the masonry swales. This structure is constructed of squared masonry blocks, rough-hewn with a smooth margin, brought to six courses including the capping stone. The large aperture arch is complete with a key stone.

#### Mugdock Masonry Header Walls: Management actions

**3.28** Neither structure requires any obvious remedial works.

#### Craigmaddie Gauge Basin (R12)

**3.29** Whilst the Craigmaddie Gauge Basin is similar in plan to the Mugdock Gauge Basin, it has more ornamentation than its sister. Craigmaddie Reservoir was constructed as an additional service reservoir to Mugdock between 1885 and 1896. The Gauge Basin has a curved header wall constructed in ashlar blocks brought to courses and dressed in a rough-hewn finish. The header wall is dominated by the centrally located ornamental panel, complete with triangular pediment. The pediment crowns the aperture and houses a granite panel inscribed with the names of four Lord Provosts, two Chairmen of the Water Board and James M. Gale, Engineer. The keystone of the aperture has a relief carving of a fish. The quoins to the aperture are embellished with six roll mouldings. The pillars which frame the central section of the header wall have alternate vermiculated stones. The ends of the header walls terminate in massive ashlar pillars, which also display vermiculated dressing. The surface area of the gauge basin measures 1,110m<sup>2</sup>, considerably larger than the Mugdock Gauge Basins which have a total surface water area of 485m<sup>2</sup>. The Craigmaddie Basin is subdivided by curved ashlar masonry walls. These are essentially horizontal arches designed to withstand the water pressure. The perimeter is enclosed by cast iron post and guard railings, which reflect the detail of the Mugdock Reservoir.

#### Craigmaddie Gauge Basin: Management actions

**3.30** As with the Mugdock Gauge Basin, the sound condition of these masonry structures act as a testimony to the quality of their design and construction. Recommended remedial action includes the removal of vegetation, typically ferns growing in the joints of the structure. Consideration should be given to reapplying the gold leaf inlay to pick out the inscription within the granite panel. As at Mugdock Reservoir, the metalwork is structurally sound, but there is evidence of corrosion beneath the paint. Where the paint finish is failing, it should ideally be removed, and the original colour finish reinstated.

#### Craigmaddie Measuring Pond (R13)

**3.31** The Craigmaddie Measuring Pond has a surface area of 1,575m<sup>2</sup> and is enclosed by stone revetments. These were never intended to be visible as they are located below the water level. They have been constructed from rough-hewn, locally quarried stone of random sizes. An iron guard rail, with 4 nr. horizontal flat bars, encloses the Measuring Pond.

#### Craigmaddie Measuring Pond: Management actions

**3.32** The robust nature of the construction determines that these engineering structures are intact with little evidence of localised failure. However, at times when the water level is drawn down, these revetment structures should be inspected and any necessary repairs, such as securing loose stones, undertaken. It is also prudent to remove any self-seeded tree saplings from above the water line to prevent tree roots from displacing individual stones and ultimately compromising the integrity of the revetment.

**3.33** Although the metal strap fence line has deflected along its length, it is not in obvious need of extensive remedial work and only localised repair is required to short lengths of defective and corroded sections.

#### Craigmaddie Causeway (R14)

**3.34** The causeway separating the measuring pond from the reservoir has a metal road and footway including concrete kerb upstand flanked on both sides by splayed masonry walls, approximately 8 metres apart. Unlike Mugdock, the water is piped between the two waterbodies via an outfall tower. The random rubble masonry walls are topped by a half-round with tooled finish cope. The western end of the south wall is terminated by three oversized ashlar stones with tooled margins. The second stone contains a benchmark ordnance survey datum 99.02 metres above sea level.

#### Craigmaddie Causeway: Management actions

**3.35** The random rubble masonry walls are structurally sound and only minor repairs to reinstate defective joints between individual cope stones are required.

#### Craigmaddie Reservoir Revetments (R15)

**3.36** The stone revetments to the Craigmaddie Reservoir vary in typology but are predominantly constructed of stone rubble pitching laid to form sloping margins (with gradients of approximately 1 in 2) around the open water areas. The stone pitching

comprises large irregular boulders bedded and jointed to create a relatively even surfaced pavement over the puddled substrate of the reservoir sides. Large areas demonstrate that the joints were mortared or bedded in clay, but there are also more informal treatments on the north-eastern margin where loose boulders were laid over the pre-existing natural topography. The revetments extend under the high water level but the exposed areas (above the water) are up to 25 metres in width. The joints in the revetment surface together with the clay substrates allows self-seeded vegetation to establish. Pioneer species are particularly successful, and their roots can penetrate through and under the revetment stonework. Left unchecked the trees can grow to substantial size, and this may damage the integrity of the revetments if trees are dislodged by wind throw.

#### Craigmaddie Reservoir Revetments: Management actions

**3.37** Due to the water level in the reservoir, it was not possible to inspect the revetment structures in their entirety. However, the portion of the revetments above the water line was visible and the following conservation needs were identified. The presence of grass and herb growth over the revetments is not problematic, and provides biodiversity benefits, however the prevalence of self-seeded tree saplings, notably Ash, Birch, suycamore and willow is of concern. Without appropriate management these will quickly establish, causing displacement of revetment stones and potential root penetration of the substrate which could impact on the integrity of the reservoir. Self-seeded tree growth is also creating dense screens in certain areas causing the loss of views over the water from the perimeter.

**3.38** It is consequently recommended that all self-seeded trees be removed from the constructed revetments. Larger trees should be removed as a matter of priority and smaller trees cut and treated to prevent re-growth. Where the revetment surface has been disrupted the affected stone blocks should be re-bedded to restore the original levels across the revetments. This procedure must be carried out regularly ie at a frequency to prevent self-seeded trees gaining a foothold (minimum bi-annually) .

**3.39** Woodland and trees growing in the natural embankments and loose rubble margins should be retained and subject to positive management to promote biodiversity and to provide views across the reservoir from selected vantage points as proposed under Chapter 11: Views & Viewpoints.

#### Craigmaddie Drawdown Tower (R16)

**3.40** The Craigmaddie Drawdown Tower has a cylindrical masonry structure constructed of blond sandstone ashlar blocks in the shape of a column capitol with a wide flat capping above moulded courses of diminishing diameter. The masonry structure is surmounted by parapet rails and valve boxes. It has recently undergone a comprehensive restoration programme that has renewed the iron bridge and refurbished the original ironwork. Stonework repairs and cleaning have also been undertaken.

#### Craigmaddie Drawdown Tower: management actions

**3.41** The recent works leave no requirements for further actions in relation to the masonry structure

#### Craigmaddie Dam (R17)

**3.42** Craigmaddie Dam is a substantial earth dam that retains Craigmaddie Reservoir on its eastern and southern sides. It supports the perimeter path which is heavily used by visitors. Its inner slopes are stone pitched revetments, and its outer slopes are maintained as cut grass. The latter is kept to a short sward to facilitate monitoring of the dam's integrity by Scottish Water, allowing identification of any deformation or leaks should such events occur.

#### Craigmaddie Dam: management actions

**3.43** There are no known requirements for interventions on the Craigmaddie Dam and for operational reasons the grass maintenance is required to produce a short sward rather than meadow grassland.

#### Craigmaddie Draw-off tower (R18)

**3.44** The Craigmaddie Draw-off Tower also has a cylindrical masonry structure constructed of coursed blond sandstone blocks with a tooled bullnosed finish. This masonry column has a wider masonry cap which is surmounted by parapet rails and a central valve box. It has recently undergone refurbishment. There are consequently no requirements for further work.



### Craigmaddie Overflow (R19)

**3.45** The Craigmaddie Overflow is a substantial masonry structure with integrated sluice gate to control discharges from the reservoir. The overflow is framed by c. 3m high ashlar masonry walls surmounted with parapet railings as described under the Ironwork chapter. Sloping wing walls extend into the reservoir and the back of the overflow has two curved walls framing a central arch / culvert entrance. The walls are constructed of coursed bullnosed ashlar with copes of smooth ashlar. An iron and concrete bridge spans the overflow and supports the sluice mechanism beneath. The floor of the overflow is insitu concrete. The masonry and concrete appears to be sound but a self-seeded Rowan is growing from a joint near the top of the west wall. Smaller shrubs are also growing within or close to the cope and ferns are growing from a number of joints. The concrete floor of the overflow has some vegetation growth along cracks and joint lines.

#### Craigmaddie Overflow : management actions

**3.46** Self-seeded woody growth should be removed from the masonry walls before roots cause displacement of masonry. Cut stems and roots should be treated to prevent re-growth.

### Dirty Dam Feeder Swale (R20)

**3.47** The Dirty Dam feeder swale runs along the north boundary of the site and takes runoff from the fields and higher ground. It follows the boundary wall running in a stone lined trough for much of its length. The channel runs both inside and outside the boundary wall, passing through culverts and bridges by arches in the connecting field walls. The swale sections outside the boundary wall are partially overgrown making it difficult to assess their condition.

#### Dirty Dam Feeder Swale: management actions

**3.48** This swale runs both inside and outside Scottish Water's boundary potentially complicating responsibilities for management. Clearly as entity this swale requires maintenance in its entirety to ensure it continues to function effectively. This will require a collaborative approach between Scottish Water and the neighbouring landowner. Water currently flows freely along the channel suggesting it is in reasonable condition, but more detailed examination is required to inform a remedial programme. It is evident that outside the boundary wall, there is a requirement to remove vegetation and soil materials from the swale and its ashlar channel to determine its condition and any requirements for repairs by the landowner.

### Dirty Dam outfall (R21)

**3.49** The Dirty Dam outfall takes the form of mushroom shaped iron structure covering the outfall shaft/ culvert entrance. At the time of surveys, this structure was partially covered by vegetation and leaf litter and had exposed bolts projecting from the top. Since that time the 'mushroom' has been removed and reinstated as part of the Dirty Dam remedial works.

#### Dirty Dam outfall: management actions

**3.50** Clear vegetation and deposited leaf litter from the structure and examine the outfall to determine any remedial requirements. Devise a plan of action for any repairs or clearance of blockages/ silt within the outfall.

### Dirty Dam Swale (R22)

**3.51** The Dirty Dam Swale carries the discharge of clean water from the Dirty Dam towards Tannoch Loch following the settlement of silt. This swale runs along the west side of Drumclog Road in a stone lined channel before passing under the road in culvert, then running inside the eastern Drumclog Road boundary wall. The channel is heavily overgrown with evidence of self-seeded trees and scrub growing from the channel walls and culvert structures. It is consequently difficult to obtain clear sight of the structures without vegetation clearance.

#### Dirty Dam Swale: management actions

**3.52** Remove overhanging vegetation and self-seeded trees from the swale masonry channel and culvert structures. Clear the channel of deposited silt and leaf litter and maintain in a clean condition for ease of future inspections and repairs. Once cleared of vegetation, survey the structure to determine remedial requirements and programme according to their severity.

## Walls

**3.53** The Milngavie Reservoirs site has extensive walls which define the boundaries, line roads and paths, divide fields and frame building plots. These walls include both freestanding and retaining walls, some of which have gateways framed by stone pillars. These structures represent important characteristic features of the landscape. The majority are stone walls built in random rubble brought to courses, mostly of whinstone with half-round copes. The walls vary in height from 1m to 1.5m and have a tapering (battered) cross section (generally 600mm wide at the base and 300mm wide at the cope). These walls commonly have large boulder 'through stones' which protrude on their back face. Common problems include:

- self-seeded vegetation growth.
- localised subsidence.
- inappropriate cement pointing.
- damage from fallen trees and branches.
- some old field walls are unmortared and have been abandoned, but most mortared walls are in sound condition.

**3.54** The main walls within the Reservoir Designed landscape have been subject to a visual appraisal to determine their requirements for repair and management actions. The wall surveyed and recorded are indicated in **Fig 4** and include the following:

- S1 Mugdock Road West outer rubble wall to drainage channel.
- S2 Mugdock Road west: road boundary rubble wall.
- S3 Mugdock Road east: road boundary rubble wall.
- S4 Lovers Walk rubble wall.
- S5 Lovers Walk high level wall.
- S6 North Boundary rubble wall.
- S7 North Boundary wall.
- S8 Barrachan plateau field rubble walls.
- S9 Barrachan south field rubble walls.
- S10 Barrachan ramp retaining wall.
- S11 Barrachan farmsteading walls & walled garden.
- S12 Craigmaddie north boundary wall.
- S13 Strathblane Road west: road boundary rubble walls.
- S14 Strathblane Road east: road boundary rubble walls.
- S15 Strathblane Road east: outer / high level boundary rubble walls.
- S16 Mugdock ramp rubble walls.
- S17 Tannoch Loch rubble wall.
- S18 Commissioners' Walk west: rubble boundary & retaining walls.
- S19 Commissioners' Walk east: rubble walls.
- S20 Commissioners' Walk entrance gates.
- S21 Commissioners' Walk old water works gateway.
- S22 Old Water Works south boundary wall.
- S23 Mugdock Reservoir south boundary wall (with Tannoch Loch).

- S24 Craigmaddie Lodge entrance gates.
- S25 Lower Craigmaddie field wall.
- S26 Mugdock Road entrance gates.
- S27 Mugdock and Craigmaddie Reservoir boundary wall.
- S28 Craigmaddie boundary wall to measuring pond.

#### Walls: General Management Actions

**3.55** Apart from the old field walls at Barrachan most of the masonry walls are intact. They have suffered, however, from localised damage, have loose/missing stones, vegetation growth or are locally subsiding. Cement pointing has been applied extensively in the past and this has been detrimental to the appearance and performance of the walls. Dead and diseased trees growing in proximity to the walls also presents a threat from falling branches or wind throw of the trees. Some trees and branches have fallen on the walls causing localised damage. There is a need to positively maintain these walls by embarking on a prioritised programme of remedial work which should address the high priority walls within a short time frame (next 5 years) followed by a second tier of priority between Years 5 and 10. Thereafter a rolling programme of wall works should continue to systematically undertake essential work. This would include removal of invasive vegetation, preventative removal of adjacent dead trees, repair of damaged and unstable sections of wall and removal of cement pointing to allow repointing with lime mortar. Self-seeded woody vegetation is a widespread issue where birch, ash, sycamore, and rhododendron take root within masonry joints, and if left unchecked can grow to destabilise the walls and eventually cause localised collapses. Softer vegetation such as Toadflax is not invasive or damaging and provides biodiversity value so should be retained.

**3.56** The extent of the walls within the Milngavie Reservoirs landscape represents a potentially onerous maintenance challenge. Remedial works and maintenance will likely require significant resources, time, and funds. This necessitates that works to the walls be prioritised and phased accordingly. Walls adjacent to public roads and access routes are highly visible and may also pose a threat to the public if they become unstable. Some walls are also essential to maintain secure boundaries and within the reservoir landscape they safeguard visitors from falling into the reservoirs. These prominent and functional walls should consequently be the priority for management actions.

**3.57** Walls in areas that are remote from access routes and not essential for operational purposes will be of lower priority for action, although their heritage value is undeniable. In several locations the walls are stable and covered in moss but not under major threat. In such cases these walls have value for natural and built heritage and could remain with minimal interventions. In such cases the main threats to the integrity of the walls are from falling trees and from self-seeded vegetation growth. The latter if unchecked can lead to damage from invasive root growth and eventually from wind impacts on the established trees or shrubs.

**3.58** Similarly metal strap fencing and associated cast iron posts and metal field gates should be reinstated where the fences define the edges of public access routes and are of a high profile. This is addressed further under Ironwork Chapter 4

**3.59** The following paragraphs provide a concise description of the walls listed under 3.54 and their requirements for management actions.

#### S1 Mugdock Road West outer rubble wall to drainage channel.

**3.60** This outer rubble wall has suffered from significant damage without evidence of previous repairs or maintenance. It has sections of collapsed wall visible from Mugdock Road and is heavily overgrown.

#### S1 Mugdock Road West outer rubble wall to drainage channel: management actions

**3.61** Remove the overgrown vegetation and self-seeded growth. Initiate a programme of repairs starting with vegetation clearance to allow inspections, followed by the rebuild of collapsed sections. Follow on with an extended programme of remedial work with phased working.

#### S2 Mugdock Road west: road boundary rubble wall.

**3.62** There is no major damage to this wall, but it has significant self-seeded vegetation growth which if unchecked will become problematic. Previous cement pointing is failing and requires replacement with lime mortar. The proximity of the wall to the road determines that it is subject to road salt spray which is damaging to stone and lime mortar. This requires that specialist advice on the

lime mortar mix is obtained to ensure the pointing is resilient. The wall is highly visible from Mugdock Road so is a high priority subject.

#### S2 Mugdock Road west: road boundary rubble wall: management actions

**3.63** Remove self-seeded vegetation. Rake out cement pointing and commence comprehensive repointing with lime mortar selected to withstand road salt spray. This work is suited to phased implementation over several years given the scale of the wall.

#### S3 Mugdock Road east: road boundary rubble wall.

**3.64** There is no major damage to this wall, but it has significant self-seeded vegetation growth which if unchecked will become problematic. Previous cement pointing is failing and requires replacement with lime mortar. The wall is immediately adjacent to Mugdock Road so is a high priority for safety and for amenity. The immediate proximity of the road to the wall determines that remedial works will require traffic management and approvals from the roads authority (EDC).

#### S3 Mugdock Road east: road boundary rubble wall: management actions

**3.65** Remove self-seeded vegetation. Rake out cement pointing and commence comprehensive repointing in lime mortar. This work is suited to phased implementation over several years given the scale of the wall. This work will require traffic management on Mugdock Road to ensure the safety of contractors.

#### S4 Lovers Walk rubble wall.

**3.66** The majority of the wall is in sound condition but has a few areas of damage and failed pointing. The wall is largely overgrown with moss and has some self-seeded woody growth along its length.

#### S4 Lovers Walk rubble wall: management actions.

**3.67** Undertake localised repairs and remove self-seeded woody vegetation from the wall. Remove failed cement pointing and repoint with lime mortar for defined panels of wall. Progress lime mortar repointing in phases.

#### S5 Lovers Walk high level wall.

**3.68** The high-level wall runs roughly parallel but is set c. 2-3 metres above Lovers' Walk separated by a steep embankment. This wall is heavily overgrown and has numerous dead trees stand in proximity, presenting a threat from falling branches. The wall is more difficult to access so has received little maintenance resulting in numerous missing stones and dislodged copes. Pointing has failed over large areas.

#### S5 Lovers Walk high level wall: management actions.

**3.69** Remove the self-seeded woody vegetation from the wall and fell adjacent dead trees that could damage the wall. Remove fallen branches from the wall-head and cut back overhanging limbs that could lean or fall on the wall. Priority repairs should be undertaken first to preserve the stability of the wall (ie rebuild fallen sections and infill holes). This should be followed by a programme of repointing with lime mortar.

#### S6 Northern Boundary rubble wall

**3.70** This wall is outside Scottish Water's ownership but is part of the setting of the reservoir landscape. The whole of this rubble wall has collapsed leaving a linear pile of stone. Some self-seeded vegetation is growing along its length. This wall is not close to public access routes and appears to no longer act as a field wall.

#### S6 Northern Boundary rubble wall: management actions

**3.71** As with other landscape features which are part of the setting of the Milngavie Reservoirs' landscape, there would be merit in liaison with adjacent landowners to encourage the positive management of the surrounding landscape features. Such encouragement might also be applied by EDC and the FOMR.



### S7 Northern Boundary wall

**3.72** This is an important boundary wall defining the northern limit of the main designed landscape area where public access is permitted. The wall is also followed by water channels which reinforce its boundary function. Most of the wall is intact and in sound condition. There are limited areas of damage and some self-seeded tree growth.

#### S7 Northern Boundary wall: management actions

**3.73** Repair localised damage to maintain the integrity of the wall. Remove self-seeded woody vegetation the overgrown and localised ivy growth. Remove cement pointing and repoint with lime mortar as part of a rolling programme of masonry conservation.

### S8 Barrachan plateau field rubble walls.

**3.74** Large sections of the old field walls have collapsed leaving linear piles of stones. The remaining standing sections are becoming unstable. Some sections retain the remains of wire fences mounted to the wall head. Most of these walls are covered in moss and have self-seeded woody vegetation growing from joints. These walls appear to have both mortared and dry-stone construction with failed pointing evident.

#### S8 Barrachan plateau field rubble walls: management actions

**3.75** Rebuild and repair sections of wall close to paths and informal access routes. Rebuild with locally salvaged stone and lime mortar. Remove woody vegetation growth from standing sections of wall.

### S9 Barrachan south field rubble walls.

**3.76** These walls are in poor condition, largely in a state of collapse leaving linear piles of stones with a few standing sections. The remaining sections of wall are mostly moss covered.

#### S9 Barrachan south field rubble walls: management actions

**3.77** Retain fallen masonry for use in rebuilding the wall. This would be a suitable project for training purposes and could be undertaken in sections over an extended period.

### S10 Barrachan ramp retaining wall.

**3.78** Most of the wall is in sound condition, although has suffered some settlement and has a few voids from dislodged stones. It is largely overgrown with moss and some shrubs close to the wall-head could damage the wall if left unchecked.

#### S10 Barrachan ramp retaining wall: management actions.

**3.79** Remove self-seeded woody vegetation from the wall and cut back shrubs encroaching on the wall-head. Undertake localised repairs to replace dislodged and loose stones. Use lime mortar for rebuilds and repointing where required.

### S11 Barrachan farmsteading walls & walled garden.

**3.80** The Barrachan farmsteading walls are largely intact but are heavily overgrown by woody vegetation making detailed inspections difficult. There are small areas of damage and where vegetation is growing close to the wall it threatens to cause damage in the future.

#### S11 Barrachan farmsteading walls & walled garden: management actions

**3.81** Remove vegetation from the wall and cut back encroaching trees and shrubs. Inspect the exposed wall to determine repair requirements and undertake localised repairs. Remove old/ failed cement pointing and repoint with lime mortar.

### S12 Craigmaddie north boundary wall.

**3.82** The Craigmaddie north boundary wall separates the reservoir landscape from fields to the north. It mostly runs at a higher level than the reservoir margin: above exposed rock faces for part of its length. The wall is c. 1.5-1.7m high and is largely sound although has some localised damage where trees/ branches have fallen on the wall, and where stones/ copes have been dislodged. Mortar joints have also failed or become 'hungry' in localised areas. Many veteran trees (incl notable Horsechestnuts) also grow close

to the wall presenting a danger of falling limbs in some cases. Some dead trees are also standing close to the wall which may present a threat if left unattended. The wall is separated from the main footpath by the embankment/ cliffs and vegetation, so is not readily accessible or clearly visible.

#### S12 Craigmaddie north boundary wall: management actions

**3.83** Remove fallen trees / branches from the wall and cut back overhanging branches that may threaten the structure in the future. Rebuild damaged sections of the wall, resecure cope stones where required, and infill holes left by fallen stones. Progress the phased repointing of the wall with lime mortar.

### S13 Strathblane Road west: road boundary rubble walls.

**3.84** Prominent boundary wall visible from Strathblane Road and consequently important to the image of the reservoir landscape. The wall is c. 1.5 m high and largely in good condition although has some self-seeded vegetation and overhanging branches.

#### S13 Strathblane Road west: road boundary rubble walls: management actions

**3.85** Remove self-seeded woody vegetation and cut back self-seeded trees and shrubs growing close to the wall. Review the condition of the pointing and progress a rolling programme of repointing with a consistent lime mortar mix specified to withstand salt spray from the adjacent road ( taking advice from the Scottish Lime Centre or lime mortar specialists) . Sample areas of repointing should first be approved as the benchmark for future work. Repointing should avoid mortar spread over the face of stones and should be undertaken in sizeable panels to avoid a patch work appearance. Mortar colour and pointing technique should also be consistent.

### S14 Strathblane Road east: road boundary rubble walls.

**3.86** Prominent boundary wall visible from Strathblane Road and consequently important to the image of the reservoir landscape. The wall is c. 1.5 m high and comprises several sections separated by road junctions. The condition is mixed with some damaged sections and lost copes, plus some self-seeded vegetation and overhanging branches The condition of the pointing is also variable including areas of cement mortar which is failing.

#### S14 Strathblane Road east: road boundary rubble walls: management actions

**3.87** Repair damaged sections of wall and reset dislodged cope stones. Remove self-seeded vegetation and overhanging branches. Review the condition of the pointing and progress a rolling programme of repointing with lime mortar avoiding small patches and inconsistency of technique.

### S15 Strathblane Road east: outer / high level boundary rubble walls.

**3.88** A second wall runs outside the Strathblane Road boundary, roughly parallel and following undulating topography. It consequently runs at both higher and lower levels than the road boundary wall. This wall is difficult to access but from visual inspections it appears to be in poor condition with significant damage along its length. The wall is also significantly overgrown and has failed pointing.

#### S15 Strathblane Road east: outer / high level boundary rubble walls: management actions

**3.89** This wall requires major repairs to reinstate its integrity. Clearance of self -seeded and overhanging vegetation should first be undertaken to allow detailed inspections and work planning. It requires comprehensive restoration working in sections from one junction to another.

### S16 Mugdock ramp rubble walls.

**3.90** Walls c. 1.3 m high flank the Mugdock access ramp and are consequently prominent features for visitors to the site taking access up the ramp. The walls are generally in good condition, although there are localised areas of failed pointing which need repair.

#### S16 Mugdock ramp rubble walls: management actions

**3.91** Removal of cement pointing and repointing with lime mortar is required. This should be undertaken for both walls in totality and simultaneously to achieve consistency and to maximise the positive impact. The timing of this work should be based on the overall level of deterioration of the cement pointing.

#### S17 Tannoch Drive boundary wall.

**3.92** The Tannoch Drive boundary wall is a prominent structure visible from Tannoch Drive and by visitors entering the reservoir landscape from this direction. This wall continues northwards to meet the Old Water Works boundary wall (S22). It is in sound condition with no significant damage or signs of instability. There are however areas of cracked/ failed pointing and vegetation encroachment.

#### S17 Tannoch Drive boundary wall.

**3.93** Remove the overhanging and self-seeded vegetation from the wall. Removal of cement pointing and repointing with lime mortar is required.

#### S18 Commissioners' Walk west: rubble boundary & retaining walls.

**3.94** Rubble walls run along the west side of Commissioners' Walk and include both retaining walls and freestanding walls. They are prominent structures in close proximity to the footway so maintaining them in good condition is imperative. They are generally in sound condition although there are areas of cracked/ failed pointing and considerable overhanging vegetation including grass, shrubs, and ivy.

#### S18 Commissioners' Walk west: rubble boundary & retaining walls: management actions.

**3.95** Remove the overgrown vegetation from the wallhead. Removal of cement pointing and repointing with lime mortar is required.

#### S19 Commissioners' Walk east: rubble walls.

**3.96** Much of the Commissioners' Walk east side is defined by hedges but walls are present in the upper area and a parallel boundary wall is present further to the east. The latter defines the eastern edge of the Commissioners' Walk corridor. These walls are intact, although have overhanging vegetation and extensive moss cover. Pedestrian gates are present in these walls.

#### S19 Commissioners' Walk east: rubble walls: management actions.

**3.97** Remove the overhanging and self-seed woody vegetation. Undertake localised repairs. Phased removal of cement pointing and repointing with lime mortar is required.

#### S20 Commissioners' Walk entrance gateway and connecting boundary wall.

**3.98** The Commissioners' Walk gateway is framed by two squared ashlar masonry pillars each comprising a base stone, a column (of three chamfered blocks) and a large cope with a rounded top. These are tightly jointed with lime putty and in good condition. The gate pillars are connected to rubble walls on both sides: the Tannoch Road boundary wall to the west, and to a boundary wall along Strathblane Road on the eastern side. The latter is c. 1.2m high with a half-round cope. It extends northwards as far as a gate to the nearest residential property (c. 100m). This wall has recently been repointed/ repaired over the first 10m and the remaining length is in sound condition although has several open joints, deteriorating cement pointing and vegetation growth from joint lines.

#### S20 Commissioners' Walk entrance gates and connecting boundary wall: management actions.

**3.99** The gate pillars only require mild cleaning. The rubble boundary wall requires removal of cement pointing and vegetation from joints followed by repointing with lime mortar.

#### S21 Commissioners' Walk old water works gateway.

**3.100** The old water works gateway is defined by two square pillars each with five courses of square / chamferless ashlar blocks, surmounted by square cope stones with pyramidal tops. On each side of the gateway are panels of railings mounted on low stone walls. These have ashlar copes into which the railing balusters are secured. The outer ends of the railing walls are terminated by squared stone pillars matching those of the gateway. All the masonry is in good condition although the low walls are moss covered.

#### S21 Commissioners' Walk old water works gateway: management actions.

**3.101** Cleaning of gate pillars and removal of moss from the low walls to facilitate railing repairs and refurbishment.

#### S22 Old Water Works south boundary wall

**3.102** The south boundary wall to the old water works is distinctive and differs from the typical rubble walls in that it comprises coursed rubble blocks with an ashlar saddle cope. Variations in topography determine that the height of the wall above ground varies from c. 700mm to 1.4m. The wall is in good condition although heavily moss covered and overgrown by vegetation in several areas. The consistency of the cope limits self-seeded vegetation but growth from the sides of the wall and in close proximity could become problematic if unchecked.

#### S22 Old Water Works south boundary wall: management actions

**3.103** Remove overgrown vegetation and self-seeded woody growth from the wall. Clear encroaching vegetation (brambles, ivy and rhododendrons) from adjacent to the wall. Undertake localised repairs where required.

#### S23 Mugdock Reservoir south boundary wall (with Tannoch Loch)

**3.104** This is a rubble boundary wall c. 1.5m high with a half round cope. It defines the boundary with residential properties and Tannoch Loch to the south. Most of the wall is in sound condition, but it is largely overgrown with vegetation limiting detailed inspection. There is evidence of open joints and deteriorating pointing. This wall is not readily accessible and partially screened by vegetation making it less prominent than other boundary walls.

#### S23 Mugdock Reservoir south boundary wall (with Tannoch Loch): management actions

**3.105** Remove the overgrown vegetation and self-seeded woody growth. Prioritise repairs to prevent escalation of problems. This should be followed by a phased programme of repointing with lime mortar, potentially as a training exercise.

#### S24 Craigmaddie Lodge entrance gates

**3.106** The Craigmaddie Lodge gateway is framed by two squared ashlar masonry pillars matching those of the Commissioners' Walk gateway. These comprise a base stone, a column (of three chamfered blocks) and a large cope with a rounded top. These have recently been refurbished with evidence of joint repointing and plastic stone repairs to both pillars. The gate pillars are connected to low ashlar copes which support metal railings on both sides of the gate. These copes are in sound condition.

#### S24 Craigmaddie Lodge entrance gates: management actions

**3.107** The recent refurbishment leaves no works required to the masonry of this gateway.

#### S25 Lower Craigmaddie field wall

**3.108** Running below the south-western section of the Craigmaddie Dam is a rubble field wall c. 1.3m high with a half round cope. The wall is largely moss covered and several trees are growing near wall presenting a possible threat to its stability. There are many open joints and old cement pointing is failing.

#### S25 Lower Craigmaddie field wall: management actions

**3.109** Remove self-seeded woody vegetation from the wall and cut back encroaching vegetation. Review trees growing near the wall to assess opportunities to reduce threats on the wall by felling or removal of overhanging limbs. Undertake localised repairs to maintain the integrity of the wall, followed by a phased programme of repointing with lime mortar.

#### S26 Lower Craigmaddie field wall connection to Strathblane Road

**3.110** This wall connects the lower Craigmaddie Field wall to the Strathblane Road boundary wall. It is similar in form to S25 and is sound condition although partially overgrown.

#### S26 Mugdock Road entrance gates: management actions

**3.111** Remove the overgrown vegetation and self-seeded woody growth. Undertake localised repairs and progress a programme of repointing with lime mortar.

### S27 Mugdock/ Craigmaddie Causeway Walls

**3.112** The main causeway between Mugdock and Craigmaddie Reservoirs is framed by rubble walls c. 1.5m high with half round copes. These walls are in good condition, although old cement pointing is failing in several locations.

#### S27 Mugdock/ Craigmaddie causeway walls: management actions

**3.113** Repoint the walls with lime mortar, addressing each wall in totality avoiding a piecemeal patchy appearance in this high-profile area.

### S28 Craigmaddie Measuring Basin Causeway Walls

**3.114** Parapet walls c. 1.5m high flank the causeway. These are in sound condition although pointing is locally defective. The west wall has a gate at its midpoint for access to the drawdown well.

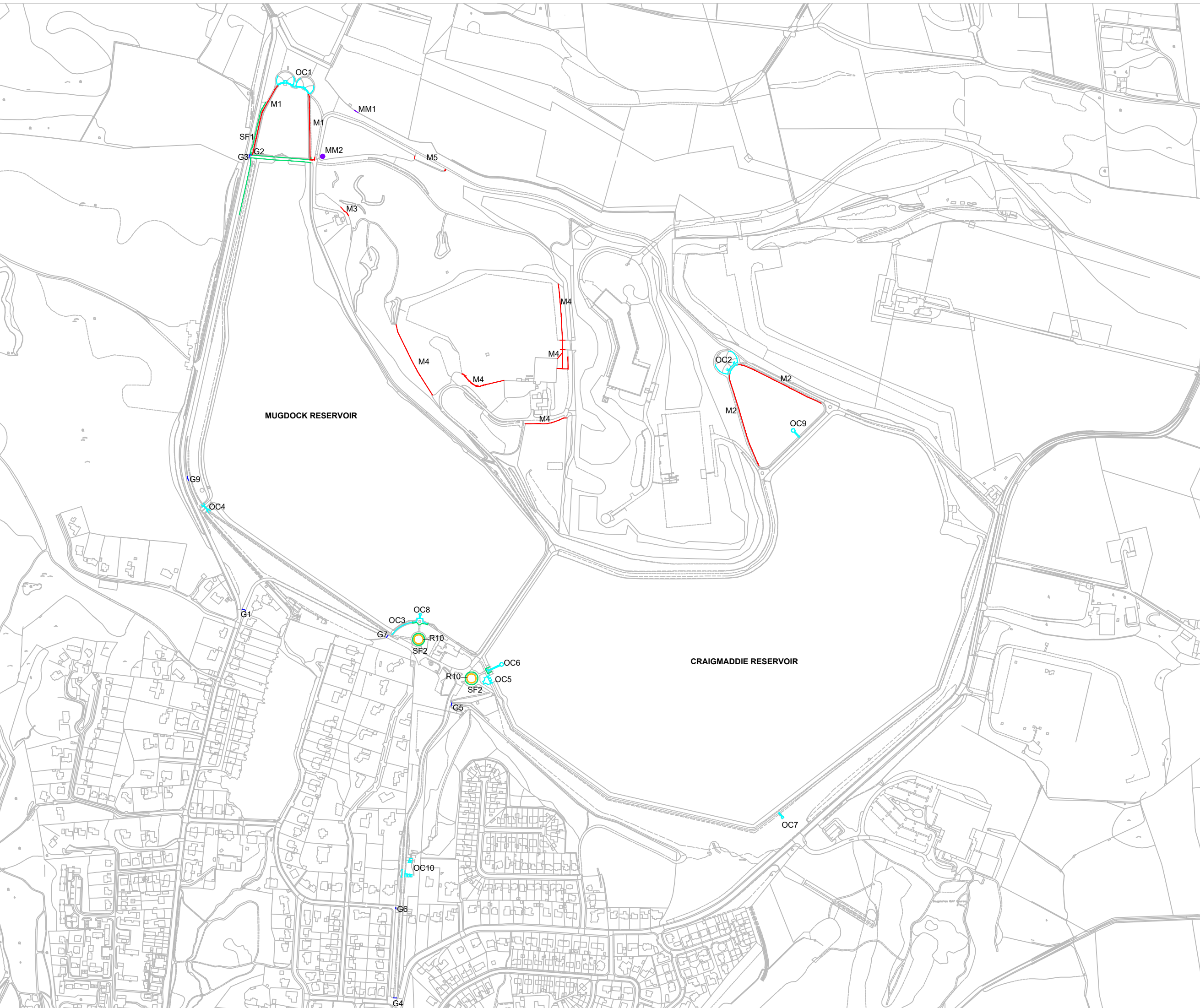
#### S28: Craigmaddie Measuring Basin Causeway Walls: management actions.

**3.115** No significant work required but planning for future repointing should be undertaken.



KEY

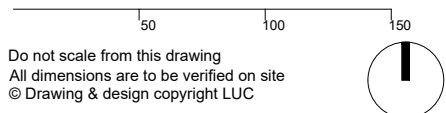
- Ornamental Post and Rail
- Metal Strap Fences
- Ornamental Iron Gates
- Security Fences
- Miscellaneous Ironwork



Milngavie Reservoirs Site Management Plan

Fig. 5 Ironwork

Scale 1:3000 @ A1



# Chapter 4

## Ironwork

### Overview

**4.1** There are numerous distinctive ironwork features within the Milngavie Reservoirs landscape. These are identified in **Fig 5** and include:

- Ornamental cast iron parapet rails and posts around the gauge basins of both reservoirs, and along the old water works perimeter with the reservoir.
- Metal strap fences around the measuring basins of both reservoirs and as field boundaries at Barrachan
- Metal strap gates and associated iron posts at Barrachan
- Ornamental gates within the perimeter of the reservoir landscape
- Ornamental railings at the old water works gateway.
- Ironwork associated with historic reservoir structures (eg straining wells and drawdown tower bridges)
- Essential Health & Safety / Security fencing and associated gates
- Miscellaneous metalwork

**4.2** Currently the ironwork features are decorated in three colours:

- Light grey is the predominant colour for the historic reservoir iron structures, parapet rails and gates on Mugdock Road
- Green for Scottish Water infrastructure adjacent to Commissioners' Walk
- Black for the Commissioners' Walk main and side gates, and for the gates at Craigmaddie Lodge

**4.3** Paint scrape analysis has been undertaken by Scottish Water to determine the appropriate colours for ironwork refurbishment. This identified the light grey colour used on reservoir ironwork structures, the dark green used on Commissioner's Walk ironwork and black with silver finials for certain gates. These colours were agreed with Historic Environment Scotland and ED for ongoing ironwork refurbishment.

### Ornamental cast iron parapet rails and posts

**4.4** Ornamental cast iron parapet rails and posts were installed in a number of locations around both reservoirs. The main type of ornamental cast iron parapets has classically styled posts which measure 37½ inches high (952.5mm) and are mounted onto circular base plates 12 inches diameter (305mm) secured by 4 no. threaded dowels and square nuts. The shaft of the post measures 51/8 inches square (130mm) at the base and 4¼ inches at the top. The capping piece to the posts are 61/8 inches square (155mm). The balustrade consists of 3 nr. solid square bars on edge. The top bar measures 1 inch square, while the middle and lower bars measure 7/8 inch square. An intermediate 'L' shaped 1½ inch flat bar is fixed to the lower bar and secured onto the stone cope midway between posts. These parapets are mounted on the large ashlar copes or onto bridge structures. These ironwork features are painted light grey and several have been recently refurbished. This type of parapet can be found at:

- Around the Mugdock Gauge Basins and Measuring Basin Causeway & associated weirs
- Around the Craigmaddie Gauge Basins and associated bridges
- Around the Old Water Treatment Works Garden perimeter with the reservoir
- Around the Mugdock Overflow walls and bridge
- Around the Craigmaddie Overflow walls and bridge
- Around the Craigmaddie Drawdown Tower and Draw-off tower
- Around the Mugdock Drawdown Tower

**4.5** A second type of ornamental cast iron post and railing was used around reservoir infrastructure adjacent to Commissioners' Walk. These comprise iron posts with (3nr) horizontal tubular iron rails.

#### General management actions

**4.6** The cast iron parapet rails and posts and rails are mostly sound; however, some localised repairs and refurbishment are required. In these cases, the recommended remedial measures include the removal of the numerous coats of paint, stripping back to sound metal before repairing and repainting. It is possible that replacement rails will be required, and these should ideally receive a robust anti-rust treatment. It is evident that recently repainted ironwork is quickly becoming dirt and algae covered. This should be cleaned off regularly to prevent deterioration.

#### OC1 Mugdock Gauge and Measuring Basins

**4.7** Ornamental ironwork painted grey and in good condition. No remedial work required.

#### OC1 Mugdock Gauge and Measuring Basins: management actions.

**4.8** Monitoring for deliberate / accidental damage followed by timely repairs. Removal of encroaching vegetation and periodic cleaning.

#### OC2 Craigmaddie Gauge and Measuring Basins

**4.9** Ornamental ironwork painted grey and in good condition. No remedial work required.

#### OC2 Craigmaddie Gauge and Measuring Basins: management actions.

**4.10** Monitoring for deliberate / accidental damage followed by timely repairs. Removal of encroaching vegetation and periodic cleaning.

#### OC3 Decommissioned Water Works perimeter

**4.11** The iron parapet around the decommissioned water works has suffered from localised damage (bent horizontal rails), paint work is peeling, and the exposed ironwork is rusting. Vegetation growing below the parapet has also become dense and is growing through and over the parapet.

#### OC3 Old Water Works perimeter: management actions

**4.12** Cut back encroaching vegetation to expose the parapet rail and to improve views over Mugdock Reservoir. Repair damaged sections of rails and refurbish in grey paint to match the existing. This will require work inside the recent security cordon.

#### OC4 Mugdock Overflow parapets

**4.13** The Mugdock Overflow walls and bridge have ornamental parapets comprising posts and rails. These have 22nr posts, one of which contains a valve mechanism. In addition, a secondary parapet length provides additional protection on the north-west side of the overflow. For this section the posts are mounted onto concrete blocks instead of masonry. These parapet rails are in sound condition and have been recently refurbished, but the caps of two posts have localised damaged.

#### OC4 Mugdock Overflow parapets: management actions

**4.14** Repairs to the damaged post caps are needed and this will involve specialists in cast iron (the valve post and standard post require attention)

#### OC5 Craigmaddie Overflow parapets

**4.15** The Craigmaddie Overflow walls and bridge have ornamental parapets comprising posts and horizontal rails (3nr). These have 27nr posts secured to the copes of the masonry walls and to the concrete bridge structure. The overflow parapets connect to those associated with the drawdown tower bridge abutment, described below. These parapet rails are in sound condition and have been recently refurbished, some minor damage is present however: one section of horizontal rail is missing and the base of one post is damaged.

**4.16** Other cast ironwork associated with the overflow includes the iron frame to the bridge, and the overflow sluice plates below the bridge. These appear to be in sound condition and have also been refurbished.

#### OC5 Craigmaddie Overflow parapets: management actions

**4.14** Repairs to the damaged post base and replacement of the missing horizontal rail are recommended and this will involve specialists in cast iron.

#### OC 6 Craigmaddie Drawdown Tower parapets and bridge

**4.17** The Craigmaddie Drawdown tower has recently undergone comprehensive refurbishment, and this has involved renewal of the lattice bridge, masonry repairs and refurbishment of the parapets on the bridge abutment and around the circular drawdown tower. The drawdown tower and its bridge are however enclosed by security fencing which prevents appreciation of the completed works. Installation of the security/ health & safety fencing has also required the removal of horizontal rails from the bridge abutment where the fence line passes through the parapet.

#### OC6 Craigmaddie Drawdown Tower parapets and bridge: management actions

**4.14** The recent refurbishment works leave no requirements for further repairs, however once the security/ H&S fencing is removed this will allow reinstatement of the missing horizontal rail within the historic parapet railing.

#### OC 7 Craigmaddie Draw-off tower parapet and bridge

**4.18** The Craigmaddie Draw-off tower and bridge connection have recently undergone refurbishment, and this has involved renewal of the bridge decking, masonry repairs and refurbishment of the parapets on the bridge and around the circular draw-off tower. Two cast iron valve boxes on top of the tower have also been refurbished in light grey paint.

#### OC7 Craigmaddie Draw-off Tower parapets and bridge: management actions

**4.19** The recent refurbishment works leave no requirements for further repairs.

#### OC 8 Mugdock Drawdown Tower parapet

**4.20** The presence of security/ health & safety fencing currently prevents access to this drawdown tower however it has been recently surveyed by Scottish Water to inform future repairs.

#### OC 9 Craigmaddie Measuring Basin spillway, parapets and bridge

**4.21** The Craigmaddie Measuring Basin spillway is an iron circular structure covering a shaft spillway. This is accessed by an iron lattice bridge that spans from the causeway to the spillway. The Spillway cover has an iron mesh surface and a parapet (ornamental iron posts and 3nr horizontal rails) around its circumference. The spillway parapet meets the lattice bridge parapets. Three ornamental iron valve boxes are also located on top of the spillway cover. The ironwork has recently undergone refurbishment in light grey paint, but staining is apparent at the base of the valve boxes and around the rim of the spillway cover.

**4.22** Access to the spillway bridge is via a spike iron gate set into the causeway wall. This gate is relatively easy to bypass and so a secondary spiked gate has been added part-way along the bridge. This is somewhat intrusive as it blocks the axial view to the Basin Headwall along the line of the bridge.

#### OC9 Craigmaddie Measuring Basin spillway, parapets and bridge: management actions

**4.23** The recent refurbishment works leave no requirements for further repairs, however more regular cleaning could prevent the build-up of algae and stains.

#### OC 10 Commissioners' Walk ornamental posts & rails

**4.24** Adjacent to Commissioners' Walk are a number of reservoir infrastructure installations, both underground and within small buildings/ structures. The underground infrastructure is protected by ornamental post and rail enclosures: three on the east side of Commissioners' walk and one on the west side. These enclose underground chambers and have metal covers. The same type of parapet is used on the top of a nearby flat roofed stone structure. The ornamental end and corner posts have distinctive spiked ball finials, while intermediate posts have no ball finial. They are painted green, differing from the light grey used on most other reservoir ironwork. These posts and rails are in good condition and appear to have been recently refurbished. Other simpler stair rails are also present in this area where steps are required to negotiate the changes in level on the east side of Commissioners' Walk.

#### OC10 Commissioners' Walk ornamental posts & rails: management actions

**4.25** The recent refurbishment works leave no requirements for further repairs.

#### Metal Strap Fences & Gates

**4.26** Compartments of the site were also enclosed by metal strap 'estate' fences. These were used as parapet rails to the measuring basins and to define the boundaries of fields and woodland at Barrachan. Two types of metal fences were used: one with a round bar for a top rail and the other a square bar on angle. Posts also differ subtly. Where used as field boundaries, they had distinctive cast iron gate posts and strainers some of which remain. Field boundary fences have a round bar top rail. However, sections of metal strap fencing have been removed and some sections have been damaged by fallen trees or by construction access over recent years.

#### M1 Mugdock Measuring Basin

**4.27** The fencing around the basin has 'H' posts and horizontal rails: 3 nr. flat bars and a square solid steel bar on edge as the top rail. Early photographs of Mugdock Reservoir show that this fence was not an original feature but added later as a safety measure. These fences have recently been refurbished in light grey paint except for the sections behind the security fencing (each c. 12 m long) where access has been prevented. These fences are in sound condition except for some deflection and leaning on the western side.

**4.28** Beyond the eastern basin gateway a separate length of fencing abuts the path. This has been damaged by vehicular impact leaving it bent but largely intact.

#### M1 Mugdock Measuring Basin: management actions.

**4.29** Refurbish rusted sections of the basin fencing behind the high security/ H&S fencing. Straighten bent and leaning sections of fencing.

**4.30** Repair and refurbish the separate fence at the basin's east gate.

#### M2 Craigmaddie Measuring Basin

**4.31** The fencing around the basin has 'H' posts and square top rails painted light grey. Those on the west side of the basin are in sound condition although leaning slightly.

**4.32** The fencing on the eastern side of the basin is overgrown with rhododendrons and has consequently not been refurbished recently. It shows signs of localised damage.

#### M2 Craigmaddie Measuring Basin: management actions.

**4.33** Remove the overgrown rhododendrons to expose the metal fencing and allow its refurbishment. This will also open up views over the basin and improve personal security in this area.

#### M3 Barrachan Hill North

**4.34** Old metal strap fences that are no longer functional for agricultural purposes. These have consequently fallen into disrepair, and some have been crushed by fallen trees or branches.



#### M3 Barrachan Hill North: management actions

4.35 Remove fallen trees and branches to allow re-erection of the fences and associated gates for heritage purposes.

#### M4 Barrachan Hill South

4.36 Old metal strap fencing and gates with ornamental posts now overgrown by shrubs and trees.

#### M4 Barrachan Hill South: management actions

4.37 Cut back encroaching vegetation to allow the straightening of horizontal rails and re-erection of any displaced posts.

### Ornamental iron gates

4.38 Several Ornamental iron gates define the entrances to the reservoir landscape and to subdivisions within the estate. The most distinctive are those set within the perimeter walls which adopt an Art Nouveau style. These were commissioned in 1919 and this design was used in several locations across the site. They are constructed from solid iron bars, in both square and flat sections. The central panel of each gate has a thistle-like motif and two curved lengths of flat bar which add visual interest. Each gate leaf has a single hinge and was originally supported on a base plate. They were secured by a lock and drop bolt.

4.39 Other gates are more traditional incorporating spiked balusters in wrought and cast iron.

4.40 Gates within fence lines and parapet rails are not detailed below but should be managed in a manner consistent with the adjoining metal fences.

#### Generally applicable management actions

4.41 Where gates are corroded or have defective paintwork, they should generally be removed off-site, sandblasted to remove the existing coats of paint and to enable defective sections to be repaired. The gates should be repainted to the agreed colour scheme based on paint scrape analysis to determine the original colour. The gates should be painted with primer and topcoats to the colour scheme approved by Listed Building Consent.

#### G1: Mugdock Road South/ reservoir ramp

4.42 Art Nouveau style gates intact but requiring refurbishment. This should include adjustments to the base plates and to the path surface levels where these prevent opening and closing. Base plates should be flush with the surrounding ground level. Refurbishment should be as outlined in 4.5.

#### G1: Mugdock Road South/ reservoir ramp: management actions

4.43 Refurbish gates and check condition of hinges and locking mechanisms.

#### G2: Mugdock Road perimeter

4.44 Art Nouveau style gates intact but not in general use. These are nevertheless prominent features requiring ongoing maintenance. These gates were refurbished in grey during 2022.

#### G2: Mugdock Road perimeter: management actions

4.45 Clean gates to remove corrosive salt spray from the road and check the condition of hinges and locking mechanisms.

#### G3: Mugdock Road perimeter north/ causeway gate and measuring basin gates

4.46 The entrance gate on Mugdock Road is of Art Nouveau style with two leaves. This gate has been recently refurbished (2022).

4.47 Gateways at the south-east and south-west corners of the Measuring Pond have been removed although their monolithic stone gate pillars are intact.

#### G3: Mugdock Road perimeter north: management actions

4.48 Clean gates to remove corrosive salt spray from the road and check condition of hinges and locking mechanisms.

4.49 There is no case to restore the lost secondary gates as these would now complicate public access and introduce an unnecessary maintenance burden.

#### G4: Commissioners Walk Main Gates

4.50 Ornamental iron gates of Victorian style. These prominent gates include three panels: one for pedestrian access and two for vehicular access. The gates are intact and were refurbished in 2022.

#### G4: Commissioners Walk Main Gates: management actions

4.51 Clean gates to remove deposited dirt and any spray from the road. Check the condition of hinges and locking mechanisms. The option to reopen the pedestrian gate should be considered. This should include a review of pedestrian access across the public road to ensure safe conditions can be achieved. This may require local footway alterations and traffic calming measures to be agreed with the roads' authority.

#### G5: Commissioners Walk Top Gate & railings

4.52 The original iron gate at the top of Commissioners Walk has been lost although the stone gate pillars, and flanking railings remain. A modern vehicle gate has been introduced in lieu of the original gate. The flanking walls are topped with cast iron railings with spiked balusters. The latter require refurbishment and the reinstatement of a small number of broken balusters.

#### G5: Commissioners Walk Top Gate & railings: management actions.

4.53 Repair or reinstate the broken balusters then refurbish in the colour approved by Historic Environment Scotland / EDC

#### G6: Commissioners Walk side gates (Tannoch Drive)

4.54 A single historic iron gate with spear topped finials set between two ornamental cast iron posts intact and operational but in need of refurbishment. Note: a matching single gate is located on the opposite side of Commissioners' Walk providing access to Scottish Water facilities. This also in sound condition but requires refurbishment.

4.55 Other railings and ironworks are present to the north of the Tannoch Drive Gate, and these also require cleaning and some refurbishment.

#### G6: Commissioners Walk side gates: management actions

4.56 Refurbish the gates and posts to the agreed colour scheme based on paint scrape analysis and with approval from EDC/ Historic Environment Scotland and the Listed Building Consent process (it is believed this should be black with silver finials to match the Main Gate).

#### G7: Craigmaddie Lodge Gates & railings

4.57 Ornamental iron gates with flanking railings, all intact and operational. This ironwork was refurbished in black during 2022. The recently introduced pedestrian gate appears incongruous and little used but is being reviewed by Scottish Water to improve accessibility.

#### G7: Craigmaddie Lodge Gates & railings: management actions

4.58 Scottish Water has concluded that the introduced pedestrian gate is still required after the upgrade of access inside the gate.

### Field gates in walls

4.59 In addition to field gates within metal fence boundaries, there are several gates set within boundary walls. These include old metal strap gates, timber gates and more modern tubular steel gates. The older metal strap gates are of heritage interest and should be preserved. One such gate is set within the north Craigmaddie boundary wall where it is visible from the footpath.

#### Management actions

When operational field gates are due for renewal it is recommended that these are replaced by gates of high quality and with a consistent design to reinforce the identity of the Milngavie Reservoir landscape. Modern replication of the historic metal strap gates using galvanised steel would be a sympathetic option.

#### Traffic Gates/Barriers

**4.60** In addition to the ornamental gates there are several modern traffic gates at vehicular entrances which swing or lift to permit access. These are painted light grey and in sound condition.

#### Security/ Health & Safety Fencing

**4.61** At the direction of the Home Office high fencing and associated gates were introduced by Scottish Water at the reservoir site between 2002 -2003. These were 2.5m high galvanised steel mesh and intended to address both security concerns and to improve safety at locations where public access could lead to accidents / risk of drowning. These fences were complemented by several gates and bollard barriers to prevent unauthorised vehicular access.

**4.62** Following the commissioning of the new Milngavie Water Treatment Works, Scottish Water requested a review of the directed security measures and subsequently removed sections of fencing (approximately 500m) between 2012-2013. However, some fencing was retained around certain structures for the protection and safety of visitors to the site. These remaining high and modern fences are intrusive despite their safety function, as they deny clear views of the reservoir, basins and their architectural features in areas of particular heritage interest.

**4.63** To safeguard water quality and ensure appropriate safety of vehicle access near the reservoirs, traffic management bollards were installed along several roadside verges. This has created traffic -free areas to the benefit of pedestrians and cyclists.

#### SF1: Mugdock Basins & Causeway

**4.64** These fences run inside the Mugdock Road boundary wall, adjacent to the Measuring Basin and to the south. Fences also run along both sides of the causeway and part way along the measuring basin perimeter, outside the parapet railings. Where the security/ H&S fences overlap the parapet railings, they have prevented their maintenance/ refurbishment leaving sections of parapet rails with rust and vegetation encroachment.

#### SF1: Mugdock Basins & Causeway: management actions

**4.65** These fences require no obvious maintenance work, but to allow refurbishment of the adjacent parapet rails, sections of the fencing should be temporarily taken down to enable access.

#### SF2: Decommissioned Water Works & Straining Wells

**4.66** Security/ Health & Safety fences encircle the two straining wells within the decommissioned water works area and are intrusive features within the otherwise ornamental garden setting. The Straining Wells are now redundant but interesting pieces of industrial architecture. These high fences restrict views of these features. It is understood that a survey of the Wells is being undertaken by Scottish Water and this may determine the necessity of retaining the fences in their current form. Other fences in the decommissioned water works area prevent access to drawdown structures and their bridges. Some of these prevent access to the perimeter of the garden area where views over Mugdock Reservoir used to be available. They have also prevented maintenance of the historic parapet rails and walls.

#### SF2: Old Water Works & Straining Wells: management actions

**4.67** The security fences require no obvious maintenance work, but temporary down-taking may be required at the perimeter to allow refurbishment of the parapet rails and management of the encroaching vegetation. In the longer-term measures to reduce the visual intrusion of these high fences but retain their safety function would be advantageous to the setting of heritage features within the designed landscape.

#### Miscellaneous Metalwork

**4.68** There are few items of metalwork located around the site that are best categorised as miscellaneous.

#### MM1: Barrachan Northern Boundary Wall Ironwork

**4.69** Horseshoes embedded into the northern boundary wall to create a 'steps' to assist with climbing over the wall. Appear to be part of the original wall structure. They are an interesting, unusual feature although are relatively hidden from the view of the public. They are in good condition with no remedial work required.

#### MM1: Barrachan Northern Boundary Wall Ironwork: management actions

**4.70** No remedial work required.

#### MM2: Barrachan North Dirty Dam Ironwork Features

**4.71** An Ironwork feature known as the 'mushroom' in the south-west corner of the Dirty Dam, is part of the siphon transferring the dirty dam water across Mugdock Road. It is circular and domed in shape c. 1m diameter with projecting bolts. At the time of surveys, it was covered with detritus and its operational integrity required examination by Scottish Water.

**4.72** The ongoing clearance of vegetation around the Dirty Dam has also revealed remaining sections of railings along ditch walls. These are short sections, parts of a more continuous historic railing. Further clearance should allow the full extent and condition of these railings to be determined.

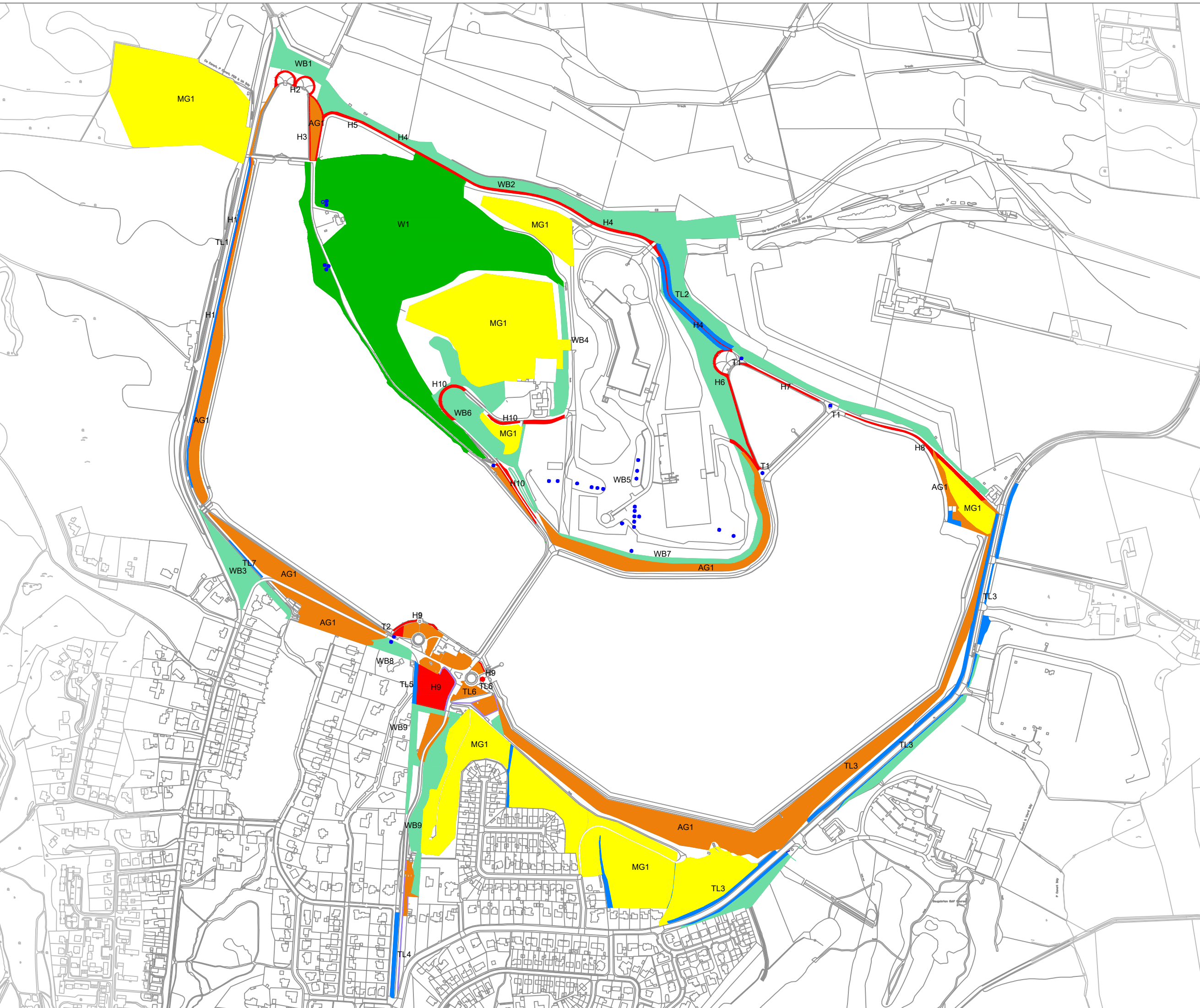
#### MM2: Barrachan North Dirty Dam Ironwork Features: management actions

**4.73** Since completion of surveys Scottish Water has cleaned and reinstated the 'mushroom', confirming that the siphon is fully operational.

**4.74** Complete vegetation clearance to allow inspection of the remaining sections of railings. This should enable the feasibility and merits of restoration/ repair work to be established.

KEY

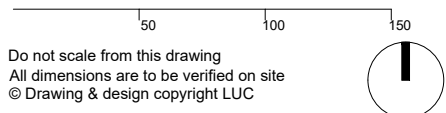
- Individual Trees
- Woodland
- Woodland Belts and Tree Groups
- Horticultural Interest
- Tree Lines
- Meadow Grass / Non Operational
- Amenity Grass / Operational Green
- Hedge Lines



**Milngavie Reservoirs Site Management Plan**

**Fig. 6 Trees, Woodlands and Ornamental Plantings**

Scale 1:3000 @ A1





# Chapter 5

## Trees & Woodland

### Overview

**5.1** The Milngavie Reservoir landscape contains significant tree cover which both pre-dates the construction of the reservoirs, and which was planted part of the designed landscape. Woodland and tree management is currently the responsibility of Bell Ingram on behalf of Scottish Water. This involves annual reviews of woodland and tree conditions to determine the need for interventions. These interventions are primarily made to remove dead and damaged trees where they represent a danger to the public, threaten to damage reservoir structures or impede Scottish Water operations. Positive management of the trees and woodlands is limited however ie control of invasive species, replacement planting, pruning/ tree surgery.

**5.2** Recently works to the Dirty Dam and associated access corridors, including the North Walk have resulted in tree and rhododendron clearance to gain access to the water body and drainage channels.

**5.3** Whilst Ash trees (*Fraxinus excelsior*) do not represent a high proportion of the woodland, they have been affected by Ash Dieback and will require removal. The same applies for Elms affected by Dutch Elm Disease.

### Spatial Distribution

**5.4** The spatial distribution of woodlands and tree cover is graphically illustrated on **Fig 6**. The largest concentration of woodland is Barrachan Wood, which forms a substantial and contiguous block of long-established woodland which pre-dates the Mugdock Reservoir. Elsewhere, almost without exception, the woodland belts, tree lines and tree groups are commensurate with the construction of the reservoirs and therefore date from circa 1855 and circa 1895. Often, they have been under planted with an ornamental shrub layer. The development of the new Water Treatment Works at Barrachan c.2006-2008 has seen the planting of some new woodland areas within its compound area.

**5.5** The woodlands and trees have been categorised as follows:

- **Woodland:** Woodland constitutes a substantial area of tree cover with an obvious woodland character. Woodland has canopy closure and contains venerable tree specimens.
- **woodland belts and tree groups:** these were mostly planted as a constituent part of the reservoir landscape. Some woodland belts have also developed as self-seeded groupings and belts eg along the margins of the reservoirs. These woodlands were, therefore, not present prior to the construction of the reservoirs.
- **tree lines:** Tree lines and avenues were also planted at the time of the reservoirs' construction. These tree lines and avenues were either planted as single tree species, or as multiple species planted in rhythmical sequences.
- **individual tree specimens:** prominent specimen trees have been recorded where they form an important feature of the landscape. They are either mature veteran trees or large in stature, making them readily identifiable as landmark features.

### Woodland

#### W1: Barrachan Woodland

**5.6** Barrachan Woodland constitutes a substantial area 7.5 hectares of mixed tree cover, containing venerable Beech, *Fagus sylvatica*, and impressive specimens including Scots pine, (*Pinus sylvestris*), Larch, (*Larix spp.*), Oriental spruce, (*Picea orientalis*), and Noble fir, (*Abies procera*). Within the woodland there are stands of single species including Beech, (*Fagus sylvatica*), Larch, (*Larix spp.*), Scots pine, (*Pinus sylvestris*), and Downy birch, (*Betula pubescens*), each displaying a unique understorey. In places tree roots have latched onto the sandstone rock outcrops. Importantly, trees within the woodland are self-regenerating, young tree saplings are found adjacent to the parent tree. Elsewhere, dead trees provide valuable pecking posts. In 2004, many mature conifers were removed by Scottish Water. This has reduced the impact of conifer specimens in the woodland. Further recent removals have also created gaps in the woodland cover.

#### W1: Barrachan Woodland: Management actions

**5.7** Management actions should assist in the natural regeneration of selected tree species including Beech, (*Fagus sylvatica*), Larch, (*Larix spp.*), and Scots pine, (*Pinus sylvestris*), and continue to remove invasive understorey shrub species including Rhododendron ponticum, which would out-compete tree saplings for light. Dead trees should be retained for wildlife benefits where they do not represent a danger to pedestrians. Dead trees adjacent to pathways must be felled and log piled at source.

**5.8** Where specimen conifers (eg firs and spruce) have self-seeded, these should be retained and protected to allow the eventual replacement of evergreen trees.

### Woodland Belts and Tree Groups

#### WB1: Mugdock Gauge Basin

**5.9** This group of trees is an evenly aged mixed plantation of fine specimens planted as a backcloth to the masonry header walls of the Mugdock gauge basins and are, therefore, circa 160 years old. The species composition comprises of: 25% Austrian pine, (*Pinus nigra*); 30% Common Lime, (*Tilia x europaea*), 15% Sessile Oak, (*Quercus petraea*), ; 15% Scots pine, (*Pinus sylvestris*), ; 10% Horse Chestnut, (*Aesculus hippocastanum*), ; and 5% Sycamore, (*Acer pseudoplatanus*). The trees are mature / becoming veteran and of large size with trunks in excess of 2m girth at 1.5m and heights between 30 and 35 metres.

#### WB1: Mugdock Gauge Basin: Management actions

**5.10** These trees comprise a significant landscape feature of historical importance. Management actions should include the removal of any hanging trees and dead wood, limb removal, to remove dead or crossed branches. The selective removal of self-seeded trees, typically Sycamore, (*Acer pseudoplatanus*), is also recommended, followed planting of replacement specimen trees into clearings. Replacement planting using species from the above list would aim to perpetuate tree cover of the original composition.

#### WB2: Woodland Walk

**5.11** This woodland is an evenly aged mixed plantation established to define the north boundary of the Mugdock Reservoir site, which today provides an important link between the Mugdock and Craigmaddie Gauge Basins. It comprises mature trees of circa 160 years old, together with self-seeded trees. The plantation is densely packed with limited space between trees and few glades. The general composition includes Scots pine, (*Pinus sylvestris*), Common lime, (*Tilia x europaea*), Larch (*Larix spp*) and Horse Chestnut, (*Aesculus hippocastanum*); in addition, there are the following species: notably the Red Horse Chestnut, (*Aesculus x carnea*), Sessile Oak, (*Quercus petrea*) and Noble Fir, (*Abies procera*). The height of the plantation varies between 30 and 35 metres. The recent works to the Dirty Dam have included an upgrade to the North Walk and some localised tree and shrub removals, but the woodland remains largely intact.

#### WB2: Woodland Walk:

**5.12** The trees comprise an important and original feature of the landscaping associated with the Mugdock Reservoir. The general condition of the Woodland Walk could be improved by the removal of any hanging trees, dead wood and crossed limbs. Most self-seeded trees, typically Sycamore, (*Acer pseudoplatanus*), should be removed to allow the regeneration or replanting of the original species composition. Additional selective removal of trees of poor quality should also be undertaken to allow more light into the woodland, to promote understorey growth and to provide more room for specimen trees to develop. Where significant gaps have been created by tree losses close to the path then replanting should be considered using specimens eg Horse Chestnut (*Aesculus hippocastanum*), Red Horse Chestnut (*Aesculus x carnea*), Sessile Oak, (*Quercus petrea*) and Noble Fir, (*Abies procera*).

#### WB3: Mugdock Road Entrance Woodland

**5.13** The Second Edition OS Plan dated 1899 indicates the existence of this perimeter belt of woodland, which has become dominated over time with pioneer tree species. Historically, the perimeter belt comprised 60% Scots pine, (*Pinus sylvestris*), 30%

Norway Maple, (*Acer platanoides*) and 10% Noble Fir (*Abies procera*). It is likely to have been planted at the time of the Mugdock Reservoir's construction and is, therefore, circa 160 years old. The woodland core consists of pioneer tree species such as Willow, (*Salix spp.*), and Sycamore, (*Acer pseudoplatanus*).

#### WB3: Mugdock Road Entrance Woodland: Management actions

**5.14** It is recommended to fell some of the self-seeded species to create clearings into which Scots pine, (*Pinus sylvestris*), Norway Maple, (*Acer platanoides*) and Noble Fir, (*Abies procera*) could be planted as future replacements. Small clearings should also be retained to promote ground flora and understorey growth. The Willow provides a valuable habitat for invertebrates and should be partially coppiced to promote multi-stemmed regrowth. There is also an opportunity to introduce understorey species to further increase the habitat potential of the woodland, including Holly, Hazel, Hamamelis spp., and Hawthorn, *Crataegus* spp.

#### WB4: Barrachan Farm Shelterbelt

**5.15** The shelterbelt linking Barrachan Wood with Barrachan Farm represents an evenly aged mixed plantation which is approximately 160 years old. The species composition includes Common lime, (*Tilia x europaea*), Sycamore, (*Acer pseudoplatanus*), Scots pine, (*Pinus sylvestris*), and small numbers of English elm, (*Ulmus procera*), Horse Chestnut, (*Aesculus hippocastanum*) and Common beech, (*Fagus sylvatica*). The trees are generally in good condition. The shelterbelt measures 220 metres in length and averages 10 metres wide and approximately 25 metres high. It is an important feature of the reservoirs landscape.

#### WB4: Barrachan Farm Shelterbelt: Management actions

**5.16** The shelterbelt is mature and in good condition. Management actions include, therefore, the retention of continuous tree cover through silvicultural management and a replanting programme using species listed above (with disease resistant cultivars for Elm and Horse Chestnut).

#### WB5: Barrachan Farm Field Boundaries

**5.17** In the former Barrachan Farm area, there are some venerable individual trees which demarcate the historic field boundaries. Some 20 nr. over mature and senescent tree specimens remain. These include Ash, (*Fraxinus excelsior*), and Oak, (*Quercus petraea*). These trees pre-date the reservoir site and are upwards of 200 years old. These trees show signs of distress and disease.

#### WB5: Barrachan Farm Field Boundaries: Management actions

**5.18** These old trees are interesting features and provide valuable habitats for invertebrates and birds (and possibly bats). They should ideally be retained where they do not represent a safety risk. Some tree surgery to increase their longevity would be beneficial. Where trees have been lost, replanting would help to recognise the historic land use patterns. Replanting should utilise oak rather than ash.

#### WB6: Barrachan Entrance Drive

**5.19** Some fine individual tree specimens surrounding the entrance drive to the Barrachan Farm complex including Common beech, *Fagus sylvatica*, Common larch, (*Larix decidua*), Sycamore, (*Acer pseudoplatanus*), and Lawson cypress, (*Chamaecyparis lawsoniana*).

#### WB6: Barrachan Entrance Drive: Management actions

**5.20** These specimens should be allowed to develop into mature, characterful trees and this should be assisted by tree surgery to remove dead wood, crossing, branches, etc. Ultimately, replacement specimens should be established in adjacent suitable spaces.

#### WB7: Craigmaddie Reservoir Plantation

**5.21** The Craigmaddie Reservoir Plantation is an evenly aged mixed plantation established on the embankment on the north side of Craigmaddie Reservoir. It was planted as a backcloth to the open waterbody and is circa 120 years old. The species composition comprises of 45% Scots pine, *Pinus sylvestris*, 15% Beech, *Fagus sylvatica*, 15% Horse Chestnut, *Aesculus hippocastanum*, 10% Downy birch, *Betula pubescens* and small numbers of Sycamore, *Acer pseudoplatanus*, Sessile Oak, *Quercus petraea*, Hawthorn, *Crataegus*, Holly, *Ilex aquifolium*, Norway Maple, *Acer platanoides*, Larch, *Larix spp.* And Wych Elm, *Ulmus glabra*. The height of the plantation varies between 20 and 25 metres, this lower height is attributed to the exposed location.

#### WB7: Craigmaddie Reservoir Plantation: Management actions

**5.22** In addition to the plantation's inherent landscape value as a backcloth to the open waterbody, the plantation now serves to reduce the visual impact of the Katrine Water Project treatment works on the reservoirs site. Good silvicultural practice to perpetuate the existing tree cover and provide successional tree cover is required. This may be achieved through a combination of replanting and regeneration. The original species composition with a high percentage of Scots pines, *Pinus sylvestris*, in the mix should be retained.

#### WB8: Old Water Treatment Works

**5.23** A group of trees predominantly Scots Pine, *Pinus sylvestris*, at the head of the ramped drive. The woodland group also contains small numbers of Noble Fir, *Abies procera* and Horse Chestnut, *Aesculus hippocastanum*. It provides a valuable visual barrier to screen the Water Works site from the surrounding dwellings and vice versa. Further, the group of trees is valuable in containing the Water Works site. The trees are of a uniform age, circa 110 years and have an ornamental shrub and grass understorey.

#### WB8: Old Water Treatment Works: Management actions

**5.24** Management should include good silvicultural practice to perpetuate the trees.

#### WB9: Commissioners' Walk woodland

**5.25** The belt of trees to Commissioners' Walk provides a valuable backcloth to further accentuate the single row of Lime, *Tilia spp.* trees. Further, they serve to contain the Water Works site and demarcate one's arrival at the heart of the site. The trees which comprise the belt comprise 50% Common Lime, *Tilia x europaea*, 20% Scots Pine, *Pinus sylvestris*, 20% Horse Chestnut, *Aesculus hippocastanum*, and 10% Sycamore, *Acer pseudoplatanus*. In addition, the belt returning along the boundary of the Water Works site includes Noble Fir, *Abies procera* and Larch, *Larix spp.* the height of the woodland belt is up to 25 metres and is circa 110 years in age. The understorey is long grass.

#### WB9: Commissioners' Walk woodland: Management actions.

**5.26** Immediate management issues include the removal of dead, leggy and overcrowded tree specimens. There are several gaps which should be planted up to reflect the original species composition. Future management actions should include good silvicultural practice to retain and perpetuate the existing long lived tree species.

## Tree Lines

#### TL1: Austrian and Scots Pine

**5.27** A single row of evenly and closely spaced Austrian pine (*Pinus nigra var. nigra*) form a distinctive boundary feature along Mugdock Road. At its southern end this line becomes a mixture of Scots and Austrian Pine and continues southwards/downhill along the western side of the stone-lined waste-water channel (which leads into Tannoch Loch). Numerous pines were also planted in the triangular area enclosed by the water channel, Mugdock Road and the Mugdock Reservoir access ramp. Scots Pine (*Pinus sylvestris*) is native but Austrian Pine was introduced into the UK in 1835 and often used for coastal shelterbelt plantings, or as individual specimen planting in parklands. The original row along Mugdock Road comprised circa 55 nr. Austrian pines, planted at 7-10m centres. Today, only c. 20 nr. of these pines remain, although some replacement trees have been introduced over the last decade. The pines which follow the water channel originally numbered circa 30nr. but several have been lost and some have been replanted. Comparison of the first (1860) and second (1898) edition OS plans of the site suggests that these pines were planted during the 1860's. The girth of the trunks: between 2.5m and 3m (at a height of 1.5m) and the height: between 30m and 35m, is consistent with an age of approximately 140 years for the original trees. Some of the mature trees have suffered wind damage resulting in broken branches. The Austrian pines have been underplanted with a continuous belt of Rhododendron. The triangular area now includes several self-seeded trees and no longer comprises just pines.

#### TL1: Austrian and Scots Pine: Management actions

**5.28** The row of mature Austrian pine, *Pinus nigra*, is a prominent linear feature of the Mugdock reservoir site, which is highly visible from both Mugdock Road and the perimeter footpath. The trees are sizeable specimens which require tree surgery to remove/tidy broken branches, to prevent disease and to ensure that safe conditions are maintained for pedestrians using the adjacent path.

Ideally the old trees should be protected and retained to become venerable specimens. Recent replacement planting has filled some of the gaps, but there remain several more gaps should be replanted with the original species (Austrian or Scots Pine dependant on location). The pines which line the water channel below the Mugdock Reservoir dam should also be restocked and selective clearance of self-seeded Sycamore and Ash should be undertaken to restore the dominance of conifers in this area. In total circa 50nr. pine replacements are needed.

#### TL2: Common Lime

**5.29** A single row of evenly and closely spaced Common lime, *Tilia x europaea*, form a distinct linear feature along the track to the north of the Craigmaddie Reservoir gauge basin. The use of a single row of Common lime, *Tilia x europaea*, is repeated elsewhere within the reservoirs site, most notably along Commissioners' Walk. This row comprises 15 nr. Common lime, *Tilia x europaea*, planted at 7m centres. They are around 110 years old and have a girth of 2.5m at a height of 1.5m, and a height of 25m. The Common limes, *Tilia x europaea*, have been underplanted with a continuous line of Rhododendron spp.

#### TL2: Common Lime: Management actions

**5.30** Recommended management actions include silvicultural management to enable these trees to mature and develop. They should be capable of reaching 250-350 years old if well maintained. Replacement planting should be undertaken as required.

#### TL3: Strathblane Road Tree Avenue

**5.31** A striking avenue of the following tree species: Common lime, *Tilia x europaea*, Horse Chestnut, *Aesculus hippocastanum*, and Sycamore, *Acer pseudoplatanus*, arranged in a recurring rhythmical pattern over a continuous 1.2km length along the Strathblane Road (A81). The 215nr. trees which today comprise the avenue were planted at 5m centres and are around 110 years old. The height varies between 20m and 25m. The understorey is rough grass.

**5.32** Individual and groups of trees along the length of Strathblane Road are subject to a permanent Tree Preservation Order (TPO Nr. D23) dated December 1990 under sections 58 and 59 of the Town and Country Planning (Scotland) Act which identifies 5 nr. specimen trees, and 3 nr. groups of trees which are included within the TPO, these are as follows:

- 4 nr. specimen Sycamore trees which are located within a field to the south of Strathblane Road known as Marchmont. These are out with Scottish Water's ownership boundary.
- 1 nr. specimen Lime, *Tilia* spp., located within the front garden of Craigmaddie Lodge.
- Of the 4 nr. groups of trees which fall within Scottish Water's ownership boundary, group G1 applies to a small group of Lime, *Tilia* spp., and Chestnut, *Aesculus* spp., trees within the rear garden of Craigmaddie Lodge. Group G2 applies to all trees within the reservoir site along the north side of Strathblane Road which form part of the continuous tree avenue. Group G3 applies to the continuous group of trees along the south side of Strathblane Road between Bankell House to the north and the sports club, entrance to the south. Group G4 applies to the continuous group of trees along the south side of Strathblane Road between the Sports Club entrance to the north and Milngavie to the south.

#### TL3: Strathblane Road Tree Avenue: Management actions

**5.33** This mature mixed tree avenue along Strathblane Road is a striking and prominent feature of the landscape associated with Craigmaddie Reservoir. The visitor's experience is further enhanced by the presence of the reservoir's earth dam which rises above the horizon line. Management issues include: to retain and perpetuate these trees through silvicultural management. Given the proximity to the road and footway any deadwood and low overhanging branches should be removed for safety reasons. Where trees have been lost, replacement planting should be undertaken to fill the gaps, and to conform with the established planting pattern.

#### TL4: Commissioners' Walk

**5.34** A single row of evenly and closely spaced Common lime, *Tilia x europaea* form the most dominant and distinctive tree line within the reservoirs site. The row comprises 40 nr. Common lime, *Tilia x europaea*, planted at 5m centres and are around 110 years old. The girth of the trunks at a height of 1.5m varies between 1.0m and 1.5m and the trees have attained a height of 20m. The understorey is rough grass.

#### TL 4: Commissioners' Walk: Management actions

**5.35** Recommended management actions include retention and care to perpetuate these long-lived tree species and maintain safe conditions below. Any gaps left by tree losses should also be filled by replanting (c. 4nr). The Common limes, *Tilia x europaea*, lining Commissioners' Walk are subject to a permanent Tree Preservation Order (TPO Nr. D24) dated 04.04.1994 under sections 58 and 59 of the Town and Country Planning (Scotland) Act which defines two groups of trees: G1: from Tannoch Drive pedestrian entrance northwards along Commissioners' walk, consists of 17 nr. Lime, *Tilia* spp., trees; G2: south of the pedestrian entrance adjacent to the west boundary, consists of 23 nr. Lime, *Tilia* spp., trees.

#### TL5: Horse Chestnut

**5.36** A single row of evenly and closely spaced Horse Chestnut, *Aesculus hippocastanum*, is a boundary feature at the head of Commissioners' Walk. The row comprises of 8 nr. Horse Chestnut, *Aesculus hippocastanum*, planted at 7m centres, which are around 150 years old. The girth of the trunks measures 2.0m at a height of 1.5m and the trees have attained a height of 25m. The understorey is rough grass.

#### TL5: Horse Chestnut: Management actions

**5.37** Management actions should include the replacement of the 4 nr. losses within the row and to retain and perpetuate these long-lived trees through silvicultural management.

#### TL6: Cedars

**5.38** A single mixed row of Cedar species, *Cedrus* spp., including *Cedrus deodara* and Atlas Cedar, *Cedrus atlantica*, planted at 5m centres, form a distinct boundary feature defining the (old) water treatment works area. The row of Cedars has become diminished through tree losses and today only 5 nr. of an original 12 nr. remain. These trees are around 120 years old, with amenity grass beneath.

#### TL6: Cedars: Management actions

**5.39** Management actions include the replacement of as many lost specimens as possible, whilst retaining the recently revised access arrangements. Replacements should restore the row of distinctive feature trees. Inappropriate commemorative tree planting has introduced small flowering tree species within the Water Works area generally. We would recommend that the relations are contacted, and these trees are translocated to a more appropriate location.

#### TL7: Masonry Rill Row

**5.40** A mixed row comprising of 9 nr. evenly and closely spaced trees of the following tree species: Norway Maple, *Acer platanoides*, Noble Fir, *Abies procera*; Sycamore, *Acer pseudoplatanus*, arranged in a recurring rhythmical pattern. The row has been planted at 7m centres and is around 110 years old. The understorey is rough grass.

#### TL7: Masonry Rill Row: Management actions

**5.41** These trees are in sound condition with no indication of imminent problems. Management actions include the retainment of these trees through silvicultural management.

### Individual Trees

#### T1: Noble Firs

**5.42** Noble Firs, *Abies procera*, were planted circa 1895 as sentinel trees to either side of the Craigmaddie measuring pond. These became unsound and were subsequently replaced. The first replacement was at the south-eastern corner of the basin and which is now a large specimen. The specimen at the western corner was replaced in c. 2006 and is now mature. It is decorated by visitors to appear like a Christmas tree.



#### T1: Noble Firs: Management actions

**5.43** The replacement Noble Firs are now well established and require no management actions other than litter picking/ tidying around their bases. The western specimen will soon outgrow its suitability as a decorated tree, requiring the removal of old decorations as they become tatty.

#### T2: Sentinel Irish Yews

**5.44** 2 nr. Irish or Fastigate Yews, *Taxus baccata* 'Fastigiata', stand as sentinels at the head of the ramp entrance into the Water Works complex. Originating in Ireland and recorded from 1780, this species is commonly found planted in graveyards and parks.

#### T2: Sentinel Irish Yews: Management actions

**5.45** Yew are long lived species but the fastigate form requires maintenance to assist these trees retain their vertical shape, which is prone to wayward limbs and dieback from the crown. Remove the smooth leaved Holly, *Ilex x altaclarensis* which has outcompeted the southernmost Yew, *Taxus baccata* 'Fastigiata'.

**5.46** The northern Yew occupies an area where the reservoir loop path enters the Old Water Works area. The introduction of the disabled car parking spaces interrupts the pedestrian route in this area causing erosion across the Yew's root plate. It is consequently recommended that alterations be made to the parking area to facilitate pedestrian access without damage to the tree.

### Memorial Trees

**5.47** As mentioned above, a small number of memorial trees have been introduced at the bequest of relatives. Most of these are small ornamental trees including grafted flowering cherries and weeping cultivars. These trees are accompanied by memorial plaques usually at their base. This type of tree is not particularly well suited to the character of the reservoir landscape, but it is recognised that there is a demand from the community to introduce memorials to their relatives within the grounds of the reservoirs.

**5.48** Scottish Water consequently requires a strategy for memorial tree requests but accepts that the potential to accommodate memorial trees of the above type is very limited. There would however be more suitable opportunities for memorial tree planting using woodland trees and future specimen trees to replace those lost or under threat.

#### Memorial Trees: Management Actions

**5.49** Scottish Water has a policy for memorial tree requests (March 2022) This requires the submission of memorial requests to Scottish Water, with options for tree species and preferred locations. Memorial requests are assessed to ensure any new trees do not represent an unacceptable maintenance burden, are suited to the designated landscape, and do not impact on Scottish Water operations. The policy accommodates trees and name plaques and confirms that memorial trees become the property of Scottish Water.

**5.50** This policy provides the framework for Scottish Water to ensure memorial trees are appropriate to their setting. It is recommended that Scottish Water introduce supplementary guidance on memorial trees which can accept different memorial scenarios, as follows:

- Ornamental 'garden' trees: these would be small ornamental trees, likely flowering species suited for small spaces within a gardenesque setting. Such settings allow easy access for relatives to visit. There are few such spaces within the reservoir landscape. These are:
  - Within the formal gardens of the old water works/ Commissioner's Cottage area. Several memorial trees have already been planted in this area, so its capacity is very limited: c 3nr trees.
  - Within the small, enclosed lawns on the east side of the Mugdock Measuring Pond c. 4nr trees.
- Exotic specimen tree planting and replacement of lost specimens. These would be recognisable but not necessarily readily accessible by the path network. Suitable sites for such specimens would include:
  - Barrachan woodlands where specimen conifers are important features.
  - In proximity to the Measuring Basins where there are backcloths of specimen trees (especially conifers)
  - Further replacement pines along the Mugdock Road perimeter

- Replacements for dying veteran tree lines across the Barrachan plateau.

- Memorial contributions to tree planting in the grounds without plaques/ recognition or the need for access by relatives

**5.51** A centralised memorial stone with a plaque could carry the names of memorial trees and their donors, to provide recognition without necessarily requiring plaques on trees. Such a memorial would obviously have to be amended each time a memorial tree is added.

# Chapter 6

## Ornamental Plantings

### Overview

**6.1** As with Woodland Belts, Tree Groups and Tree Lines, ornamental planting formed an important characteristic of the reservoir landscape which complements the architecture and tree arrangements within the site.

**6.2** As was the case with certain tree lines, selected shrub species were historically arranged to form rhythmical planting patterns. There is a relatively small selection of ornamental ericaceous (acid loving) shrubs which were planted within the reservoirs site, these are as follows:

- **Rhododendron luteum** (*Rhododendron luteum*, syn. *Azalea pontica*). This is a common fragrant yellow flowering azalea. It forms a medium sized deciduous shrub occasionally growing up to 3.5 metres in height and width. The autumn foliage is a delightful display of rich warm colours ranging from crimson, purple and orange. The funnel shaped yellow and richly scented flowers are borne in late spring. It looks particularly striking in late spring when underplanted with bluebells.
- **Rhododendron ponticum** the most common and most extensively planted rhododendron within the reservoirs site. It forms a large evergreen shrub with lilac-pink flowers in late spring. *Rhododendron ponticum* is an invasive shrub which quickly establishes a woodland understorey. It, therefore, requires constant control to avoid the loss and suppression of other species and habitats. In certain locations, it forms useful 'structure' planting which can be an effective screen and windbreak. It is, therefore, an understandable if somewhat monotonous choice of flowering shrub for lining drives and walks throughout the reservoirs site.
- **Prunus laurocerasus**, (Cherry laurel or Common laurel). A rigorous and wide spreading, evergreen shrub which grows to 6 metres in height and width. The leaves are a large, glossy green. Cherry laurel is mostly planted for its screening qualities, its white flowers and dark rounded fruit are often overlooked. It successfully regenerates when cut hard back to ground level.
- **Prunus lusitanica** (Portuguese laurel). Again, a large evergreen shrub often planted for its screening qualities. It develops into a small to medium sized tree and has a beautiful form when allowed to develop naturally. It has smaller ovate leaves than the Cherry laurel, *Prunus laurocerasus*, with red stalks. The small white scented flowers are borne in long racemes in early summer. Again, these are often overlooked. The fruits are small and ripen from red to purple. It is considered to be hardier than the Cherry laurel, *Prunus laurocerasus*.

**6.3** In many areas the above evergreen planting still exists and has become overgrown, necessitating hard pruning to prevent the shrubs from blocking access routes and closing views. *Rhododendron ponticum* has become invasive, spreading beneath the woodland canopy, and restricting the growth of ground flora or self-seeded trees. Some rhododendrons have also reverted to their 'wild ponticum' form thereby reducing the diversity of the flowering rhododendrons.

**6.4** In addition to shrub beds and belts there are several clipped hedgerows in prominent locations which enclose garden areas and define boundaries. These include Privet (*Ligustrum vulgare*) and Beech hedges (*Fagus sylvatica*).

**6.5** The horticultural components can readily be grouped in accordance with their location as identified in **Fig** and as described below:

- Mugdock Road.
- Mugdock Reservoir Gauge Basins.
- Mugdock Reservoir Measuring Pond.
- North Walk.
- Dirty Dam.
- Craigmaddie Reservoir Gauge Basin.
- Craigmaddie Measuring Pond.
- Craigmaddie Lodge Drive.

- Old Water Treatment Works.
- Barrachan Entrance Drive.

### Horticultural Components

#### H1: Mugdock Road, Rhododendron

**6.6** Inside the Mugdock Road boundary wall is a belt of *Rhododendron ponticum* over 600 metres underplanted to the Austrian pine, *Pinus nigra*, tree line. This has become discontinuous with several gaps appearing. The loss of pines from this corridor has also caused disruption leaving gaps, some of which have received replacement pine trees. Most of these Rhododendrons have reverted to their wild state, *ponticum*. Where they remain, they are generally 4-5m in height, reinforcing the Mugdock Road boundary. Some specimen Rhododendrons remain within this belt.

#### H1: Mugdock Road, Rhododendron: Management actions

**6.7** Further reinstatement of the Austrian Pine tree line is recommended for this belt, and this will require some localised clearance of the remaining Rhododendrons. The removal of selected oversized and leggy specimens should be undertaken, and pruning should be undertaken to improve the shape and prevent encroachment over the adjacent path. Restocking this belt with more varied rhododendrons and other evergreen shrubs is recommended to add additional flower and foliage interest.

**6.8** Rhododendron varieties should include:

- *Rhododendron augustinii*: large, small-leaved evergreen with blue flowers.
- *Rhododendron augustinii* 'Electra': large, small-leaved evergreen with clusters of violet-blue flowers.
- *Rhododendron ciliatum*: medium sized dome shaped with peeling bark and fragrant bell-shaped pink flowers.
- *Rhododendron davidsonianum*: medium sized to large evergreen with soft pink through to purple flowers in prolific clusters.
- *Rhododendron fulvum*: large evergreen with large, polished leaves, pink bell-shaped flowers borne in early spring.
- *Rhododendron niveum*: large evergreen which requires shade. Large leaved, with blue to rich purple flowers borne in tight, globular flower heads.

**6.9** The rhythmical planting approach should be adhered to. When replanting into rows, replace every fourth or fifth plant within the row with the same variety of Rhododendron or alternative species. Repeat this process at intervals (say 5-10 years) with another variety of Rhododendron, and so on until the existing shrubs are replaced. Given the proximity to the footpath, the inclusion of some scented flowering shrubs is also recommended. Maintaining an evergreen shrub belt is recommended introducing some alternatives to Rhododendron selected for their foliage interest, flowers, and scent eg:

- *Camelia* spp
- *Viburnum rhytidophyllum*
- *Pieris* spp
- *Elaeagnus* spp
- *Choisya ternata* (scented)
- *Osmanthus x burkwoodii* (scented)
- *Viburnum x burkwoodii* (scented)

## H2: Mugdock Reservoir Gauge Basins

**6.10** A group of mixed flowering shrubs were planted as an ornamental backcloth to the Gauge Basins. The original planting bed layout is clearly illustrated in a historical photograph circa 1900, which reveals 3 nr. large circular beds, over 4 nr. linear beds and a central bed, symmetrically aligned on the embankment above the gauge basins. Today, these distinct planting beds have merged to form one homogenous mass of shrubs comprising of *Rhododendron luteum*, *Rhododendron ponticum*, *Prunus laurocerasus* and *Prunus lusitanica*.

### H2: Mugdock Reservoir Gauge Basin: Management actions

**6.11** Over time, *Rhododendron ponticum* has become the dominant species. Our recommendations are for the removal of any oversized and leggy *Rhododendrons* and replacing with *Prunus lusitanica* to perpetuate the backcloth to the gauge basins and provide useful screening of the entrances to the aqueducts.

## H3: Mugdock Reservoir Measuring Pond

**6.12** This comprises the ornamental shrub planting at a wedge-shaped area of ground to the east of the measuring pond. The original planting layout, which consisted of a continuous planted perimeter and 3 nr. circular beds of decreasing size, is illustrated on a historical photograph taken from the Mugdock Road elevated viewpoint above the reservoir, circa 1900. The species mix is principally *Rhododendron ponticum* with some *Prunus laurocerasus*. This perimeter of large evergreens has become overgrown reducing the size of the grassed open spaces and restricting access and visibility into this area.

### H3: Mugdock Measuring Pond: Management actions.

**6.13** Recommended management actions include the removal of alternate shrubs and hard pruning of the remaining perimeter shrubs to increase the grass spaces and to open views across the wedge-shaped garden. Where established shrubs are not viable for retention, remove and replant other blue and purple flowering varieties of *rhododendron* to add interest.

## H4: North Walk

**6.14** The drive linking the gauge basins of the two reservoirs was planted out with a continuous avenue of *Rhododendron ponticum*, that used to line both sides of the route over a length of 750 metres. Recent works on the Dirty Dam have undertaken *rhododendron* clearance along the north bank of the Dirty Dam and further east along the line of the drainage channel. This clearance has opened up views across the Dirty Dam and allowed light into the North Walk corridor. The clearance works have however left stumps within the south verge of the path.

### H4: North Walk: Management actions

**6.15** The recent clearance of *rhododendrons* along the side of the Dirty Dam has created a more open walk with views across the Dirty Dam. This provides visual interest and amenity value and so it is recommended that the cleared area be retained as a grass verge with native planting for biodiversity benefits, rather than replanted with evergreen shrubs. *Rhododendrons* on the north side of the North Walk should be retained but pruned to facilitate access. Shrubs in poor condition should be removed and replaced with additional varieties of *Rhododendron* to increase the flower and foliage interest. It is also recommended to introduce some alternatives to *Rhododendron* selected for their foliage interest, flowers, and scent.

## H5: Dirty Dam

**6.16** The north and west banks of Dirty Dam were originally planted out with ornamental shrubs, principally *Rhododendron ponticum*. These have largely been removed as part of the Dirty Dam remedial and dredging works. This has left disturbed ground around the north and south dam margins including a number of trees left in the bank of the dam. The west bank had not been cleared at the time of survey and was densely covered by *rhododendrons* with some self-seeded trees in the embankment. Scottish Water have prepared proposals for the reinstatement of the dam margins with a mixture of ground flora, ornamental shrubs and retained trees. This work will allow views of the water body from the adjacent paths. Completion of the Dirty Dam works will result in a more attractive water body visible from the adjacent paths.

## H5: Dirty Dam: Management actions

**6.17** The recent clearance of *rhododendrons* provides an opportunity to improve amenity and biodiversity in this area. The Scottish Water proposals will achieve such benefits. It is also recommended to undertake *rhododendron* clearance along the west embankment to allow the introduction a wildflower verge along the cleared area and to extend native understorey shrubs to provide a visually permeable buffer between the path and the water. Existing trees in the west embankment should be selectively retained but pruned to allow views under their canopies. Poorly formed and dying trees should be removed to open up the views and allow light into the path corridor.

## H6: Craigmaddie Reservoir Gauge Basin

**6.18** As with the Mugdock Gauge Basins, a group of mixed flowering evergreen shrub species were originally planted as an ornamental backcloth to the masonry header wall structure. Also, a variety of evergreen shrubs had been planted around the base of the original Noble Fir, *Abies Procera*, on the east side of the gauge basin. The varieties of flowering shrubs include *Prunus lusitanica*, *Prunus laurocerasus* and *Rhododendron ponticum*.

### H6: Craigmaddie Reservoir Gauge Basin: Management actions

**6.19** There is a gap within the existing planting to the gauge basin which should be infilled to respect the existing planting arrangement of *Rhododendron ponticum*, *Prunus lusitanica*, *Rhododendron ponticum*, followed by *Prunus laurocerasus*, *Rhododendron ponticum*, repeating. The incremental replanting of the existing shrubs with like for like species should be commenced.

## H7: Craigmaddie Measuring Pond

**6.20** The east bank of the Craigmaddie Measuring Basin is lined by a dense belt of evergreen shrubs comprising a rhythmical pattern of planting of Cherry laurel, *Prunus laurocerasus*, *Rhododendron ponticum*, Portugal laurel, *Prunus lusitanica*, *Rhododendron ponticum* and Cherry laurel, *Prunus laurocerasus*, repeating over a distance of 150 metres. These shrubs have become large and invasive now blocking views of the basin and damaging the parapet rails.

### H7: Craigmaddie Measuring Pond: Management actions.

**6.21** It is recommended that the overgrown shrub belt be removed to allow refurbishment of the parapet rails, and to open views across the basin. Roots should be grubbed up to allow replacement planting with low maintenance evergreen groundcover shrubs eg *Pachysandra terminalis* or a grass verge.

## H8: Craigmaddie Lodge Drive

**6.22** There is a similar rhythmical planting pattern to the south of the drive over a distance of 100 metres with alternating Cherry laurel, *Prunus laurocerasus* and Portugal laurel, *Prunus lusitanica*. Some inappropriate replacement shrubs have been introduced along this line.

### H8: Craigmaddie Lodge Drive: Management actions

**6.23** Firstly, replace inappropriate replacement planting with the appropriate species to match the rhythm. In approximately 15 years' time, consider the replacement of all *Prunus lusitanica*; in 30 years' time, consider the replacement of all *Prunus laurocerasus*. Both varieties of *Prunus* spp. respond well to hard pruning, whereby the large stems are cut back to above ground level to promote new growth. This approach should be trialled and if it proves successful, adopted throughout the reservoirs site for *Prunus laurocerasus* and *Prunus lusitanica*.

## H9: Old Water Treatment Works

**6.24** Historical photographs reveal that the Water Works' site, historically contained ornamental planting beds within well maintained lawns. The main beds were arranged around the straining wells but have since been removed. Three circular planting beds were also laid out in the grass area in front of the row of Cedars. These have also been removed. The existing garden areas are consequently simpler with some remaining mature shrubs and several trees, including some small memorial trees.

**6.25** Following the removal for the former Chlorination Plant and concrete plant from the area to the south of the Commissioners' Cottage, a new garden has been created. This is a newly developed area intended as a biodiversity garden accessed by a new path



network. Adjacent to this are areas enclosed by clipped beech hedges. These were once planted out as a rose garden and a heather rockery but are now maintained as amenity grass.

**H9: Old Water Treatment Works: Management actions**

**6.26** Explore the potential to reintroduce horticultural interest around the straining wells if fences can be removed in the future, subject to approval by the Home Office.

**H10: Barrachan Entrance Drive**

**6.27** A row of ornamental shrub planting lines the entrance drive to Barrachan. The lower section heading up from the dam consists of Scotch laburnum, *Laburnum alpinum*, Portugal laurel, *Prunus lusitanica*, and Cherry laurel, *Prunus laurocerassus* and *Rhododendron ponticum*. The middle section of the driveway consists of individual specimens of *Rhododendron ponticum* and *Rhododendron luteum* clustered around the bend. The top section consists of *Rhododendron ponticum*. The southern side of the drive is lined by a clipped privet hedge.

**H10: Barrachan Entrance Drive: Management actions**

**6.28** Through a combination of management and planting, regenerate, and replant to respect the original planting composition.

# Chapter 7

## Grasslands

### Overview

**7.1** The Milngavie Reservoir landscape contains areas of grassland which are currently maintained and unmaintained. These can be categorised as follows:

- Ornamental lawns/ amenity grass (non-operational)
- Amenity Grass (operational)
- Meadow grass (non-operational)

### Ornamental lawns

**7.2** Ornamental lawns are relatively small in area and are associated with the gardens around the Commissioner's Cottage and Straining Wells. These are high profile areas close to the car parking areas for disabled drivers and at the junction of key access routes. These lawns are intended to be close mown and more formal to complement the buildings and specimen trees.

#### OL1: Ornamental Lawns: management actions

**7.3** The ornamental lawns surrounding and close to the Commissioner's cottage have not been highly maintained over recent years and have consequently lost their formality. Enhancement of the maintenance regime and lawn condition would benefit the image of the reservoirs in this prominent location. If and when new uses are found for the Commissioner's Cottage and adjacent buildings, then the surrounding gardens should be upgraded in a complementary manner.

### Amenity Grass (operational grass)

**7.4** Significant areas of grassland are maintained by regular mowing to provide a short-medium height sward. These areas predominantly relate to the Mugdock and Craigmaddie reservoirs' (earth) dam structures which are grass covered. These are maintained as short grass to enable Scottish Water to monitor their condition and to readily identify any bulges, signs of instability or leaks that would threaten the operational integrity of the reservoirs. Tree and scrub growth is prevented on these earth structures, leaving them as open grassland. The location of the dams makes them highly visible from the adjacent public roads and from Milngavie.

**7.5** In addition to the earth dam grasslands there are other areas of amenity grass within the landscape that are valuable as green open spaces allowing views and providing spaces for passive and active recreation. These amenity grass areas are located along the western side of Mugdock Reservoir, on the eastern side of the Mugdock Measuring Basin, on the embankment to the north of Craigmaddie Reservoir, and along path/road verges in several areas. These grasslands are also cut regularly to maintain a short-medium height sward.

#### AG 1: Amenity Grass: management actions

**7.6** For the most part there is no need or justification to change the operational / amenity grass areas, and for operational reasons, the dam grasslands need to remain as mown grass without more diverse planting. However, there are opportunities to develop more biodiversity within some of the amenity grass areas. Key targets would be:

- The upper section of the embankment to the north of Craigmaddie Reservoir ie above the terrace could be developed as a wildflower meadow area, leaving the lower part of the embankment as amenity grass.
- The enclosed area at the east end of Craigmaddie Reservoir could be developed as meadow grassland retaining mown verges and spaces for visitor amenity.
- Areas of the Commissioners' Walk grasslands could be developed for both amenity and biodiversity by planting bulbs along the rear margins of the corridor.

### Meadow Grass

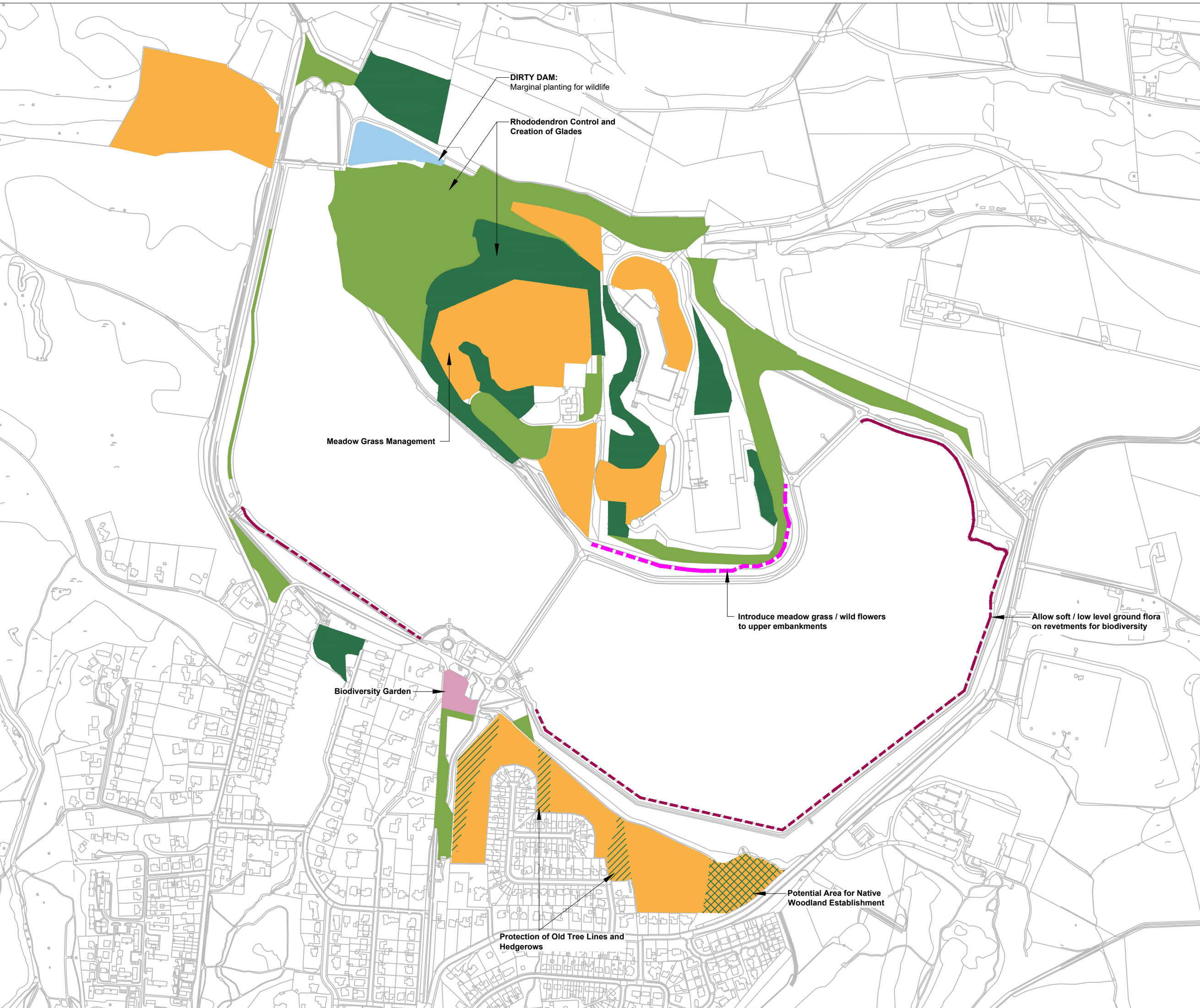
**7.7** Most of the former pastoral fields which formed part of the original farmland have been unmaintained and have become rank grassland. These are mainly within the Barrachan area, but also below Craigmaddie Reservoir. The absence of maintenance has reduced their potential biodiversity. The meadow grass areas provide open spaces although their potential uses are limited at present.

#### MG1: Meadow Grass: management actions

**7.8** The main actions recommended fall into the 'maintenance' category for these grasslands. There is potential to develop biodiversity by introducing periodic mowing (or grazing) including the removal of cuttings, to stimulate wildflower propagation. In some areas the local introduction of mowing could also make spaces more usable for amenity eg picnicking.

KEY

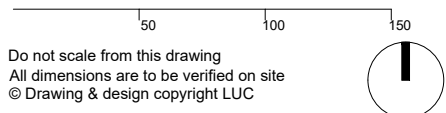
- Neutral Grassland Management
- Predominantly Native Woodland and Rhododendron Control
- Mixed Woodland Management and Rhododendron Control
- Meadow Grass
- Biodiversity Garden
- Dirty Dam: Marginal planting for wildlife
- Protection of Old Tree Lines and Hedgerows
- Potential Area for Native Woodland Establishment
- Allow soft / low level ground flora on revetments for biodiversity
- Introduce meadow grass / wild flowers to upper embankments



Milngavie Reservoirs Site Management Plan

Fig.7 Biodiversity Improvements

Scale 1:3000 @ A1





# Chapter 8

## Biodiversity

### Overview

**8.1** There are a number of areas identified for Biodiversity improvements as displayed in **Fig 7**.

#### Sites Designated for Nature Conservation

**8.2** There are statutory and non-statutory nature conservation designations in the vicinity of the Milngavie Reservoirs. These sites demonstrate the importance of the reservoirs site in landscape-scale ecology terms, as they provide habitat connectivity between designated sites to the north-west and south-east.

#### Statutory Designations

**8.3** There are three national statutory sites for nature conservation within 2 km of the reservoirs. Adjoining the site's western boundary is Mugdock Wood Site of Special Scientific Interest (SSSI). Mugdock Wood is an unusually large area of relatively undisturbed ancient deciduous woodland. A variety of woodland types are represented here, from dry acidic oakwood to wet alderwood. The woodland plant communities are of a southern type and distinct from the other woodlands in central Scotland. An unusually large number of vascular plants occur here including several which are rare or local in their distribution, for example, skull-cap *Scutellaria galericulata* and smooth-stalked sedge *Carex laevigata*.

**8.4** An unusual feature of this site is the extensive mosaic of semi-natural habitats associated with the woodland, including mire, heathlands, grasslands, and open water. This includes a 67-hectare area of heathland called Drumclog Moor. The main types of vegetation here are heather-dominated dry heath, birch woodland, and grassland with extensive areas of bracken. Several Nationally Scarce plant species occur here, including small cow-wheat *Melampyrum sylvaticum*. Mugdock Loch, lies to the north of the SSSI. The Nationally Scarce least water-lily *Nuphar pumila* grows in abundance on the loch.

**8.5** Immediately adjacent to the western edge of Mugdock Wood SSSI is a small strip of land along the Allander Water which was designated as Craiggallian Marshes SSSI. The site is a relatively extensive area of poor-fen vegetation growing on peatland habitat adjoining the Allander Water, dominated by tall herb species. Plant communities of this type are uncommon throughout Central Region. An unusually large number of species are found here, including several which are rare throughout the Region, notably wood club-rush *Scirpus sylvaticus* and lesser pond-sedge *Carex acutiformis*.

**8.6** 1.5 km to the north-west of the site lies Dumbreck Loch Meadows SSSI. The site was designated because it contains the largest area of unimproved herb-rich lowland grassland in the central Scotland. An exceptionally large number of grassland plant communities and plant species are found here, including globeflower *Trollius europaeus* and tawny sedge *Carex hostiana* which are indicative of ancient meadows, and several of which are locally rare such as mountain everlasting *Antennaria dioica* and field gentian *Gentianella campestris*. An exceptionally high number of orchid species and their hybrids occur here including frog orchid *Coeloglossum viride*, common twayblade *Listera ovata* and greater butterfly orchid *Platanthera chlorantha*. The site also supports a number of other wildlife habitats, including open water, birchwood, alder carr, floating bog and wet and dry heathland. The rich invertebrate fauna includes small pearl-bordered fritillary *Boloria selene*, a species which is on the decline elsewhere.

#### Non-Statutory Designations

**8.7** Several non-statutory areas have been designated in and around Milngavie Reservoirs. At a local level, the Craigmaddie and Mugdock Reservoirs themselves are a Local Nature Conservation Site (LNCS) area. Immediately to the south of the site is the Tannoch Loch LNCS and to the south-east are Dougalston Estate and Loch SINC, and the Bardowie Loch and wetland LNCS. The southernmost area of Mugdock Woods SSSI is also designated as Mugdock Wood and Drumclog LNCS.

**8.8** NatureScot's Ancient Woodland Inventory shows that within the study area, around Barrachan, there is an area of long-established woodland of plantation origin. Mugdock Wood (to the north-west of the site) is also listed as ancient woodland within the inventory.

#### Habitat baseline

**8.9** The site is located in the very north of Milngavie, close to the boundary with Stirlingshire. Craigmaddie and Mugdock Reservoir, which remains operational, is a very busy and important recreation area for the local community and, as such, it is managed for amenity rather than nature conservation.

**8.10** The site is bound to the north by agricultural land, to the south by residential areas of Milngavie, to the east by the A81, beyond which is a golf course, and to the west by the Mugdock Woods and Drumclog LNCS, separated by Drumclog Road.

**8.11** The site is dominated by the open water of the operational reservoirs, with other dominant habitats being semi-mature mixed woodland, semi-improved neutral grassland, and amenity grassland.

**8.12** The reservoirs themselves support no emergent or submerged vegetation, however their engineered banks support scrub, mostly birch and alder, and patches of neutral grassland.

**8.13** The site's woodlands and grassland offer greater value. The woodlands, which are largely mixed, are mature and of varied structure, allowing light to penetrate to the ground layer. However, in several locations, particularly around the perimeter of the site, the woodlands are dense, and the canopy closed. Most woodland areas are dominated by mature sycamore, beech and Scots pine with rhododendron outcompeting scrub and ground layers. Ash, horse chestnut and larch are also well present in the woodland areas, and, in several locations, larch is the dominant species. Planting has been introduced as a screen around the Scottish Water facility in the centre of the site. Here the woodland is immature, and comprises a mix of oak, beech, rowan and Scots pine. Woodland is generally disturbed by extensive recreational use, particularly mountain biking and commercial dog-walking.

**8.14** Grasslands on the site vary extensively. In the south and east, around the reservoir, the reservoir banks support amenity grassland. The sward is very closely cropped, however selfheal *Prunella vulgaris* was identified, suggesting that the species mix may be more varied, if allowed to develop. Grasslands below the Craigmaddie Reservoir embankments, and the east of Commissioner's Walk are allowed to grow long over summer and are more species rich. The annual mowing helps in this regard.

**8.15** In the centre of the site, on the Barrachan plateau, semi-improved neutral grasslands are present between woodland areas. The grasslands are largely rank and have gone unmanaged and, as a consequence, bramble has encroached extensively. The grassland species mix appears to be dominated by tufted hair-grass *Deschampsia cespitosa*, Yorkshire fog *Holcus lanatus* and, in wetter areas, sharp-flowered *Juncus acutiflorus* and soft rush *Juncus effusus*. Herbs are suppressed due to the rank nature of the grasslands, but vetches, birds-foot trefoil *Lotus corniculatus*, clover *Trifolium repens*, ragwort and thistles were all present.

**8.16** To the north-west of the site is the Dirty Dam. At the time of surveys works were ongoing and access was restricted, however it would appear that this dam has significant potential for invertebrates and water birds.

**8.17** No direct evidence of protected species was identified during the survey; however, habitat conditions are optimal for otter, despite the high levels of disturbance experienced. The woodland areas of the site support extensive suitable habitat for a range of bird species, while particularly mature trees offer some potential for roosting bats. Similarly, the buildings within the site offer roosting potential for bats. Bat boxes were noted on the mature Scots pine to the north-west of the Site.

**8.18** The woodlands also provide suitable habitats for squirrels although Red Squirrel were not seen during surveys. Anecdotally Pine Marten have been seen in the vicinity of the Milngavie Water Treatment Works suggesting that there would be merit in more intensive biodiversity surveys and monitoring.


### Management Suggestions

**8.19** The following management prescriptions are outlined on **Fig 7**. These require further development and adoption within the maintenance plan where ongoing actions are required. These are discussed in the Maintenance plan.:

- Many of the site's woodlands, which appear to be Victorian plantations, support extensive stands of Rhododendron. Consequently, ground flora is suppressed, particularly in the north of the site. Consideration should be given to targeted Rhododendron control.

- Woodland enhancement including the creation of glades. Glades can either be coppiced or left as grassland and scrub. Where possible, glades should link up to create wildlife corridors. It may not be appropriate to create large glades or wide rides in small woodlands; creating narrow paths and rides can offer a suitable alternative.
- Targeted areas for restoration and enhancement eg. structured planting to discourage access to woodlands with higher value ground flora (such as the north of the site) and to areas in which management interventions are implemented to enhance the woodland habitat.
- Neutral grasslands to the north of the site, are becoming rank and will, in time, lose their species composition. Consideration should be given to a cutting or grazing regime that will maintain the diversity of species in these areas.
- Amend mowing regime on the reservoir slopes to the north of Craigmaddie Reservoir to encourage greater diversity in the grassland.
- Introduce annual mowing and clearance of cuttings to the Barrachan plateau to promote biodiversity.
- Clear cuttings from infrequently cut areas below Craigmaddie Reservoir and to the east of Commissioner's Walk
- Ongoing recreational use of the site is inevitable, however further efforts could be made to encourage sensitive use of the woodlands, perhaps through interpretation or signage.
- Improving connectivity through restoring gaps in treelines and hedges and creating meadow grass corridors.
- Ensuring any vegetation management is completed at the right time of year to avoid the nesting birds' season.
- Removing cut grass so that it is not left to fertilise grassland.
- Retention of dead wood, provision of piles of brash, stones etc in suitable locations to create wildlife habitats and improve biodiversity.
- Monitor deer activity to determine if management measures are required to protect ecologically sensitive / valuable areas of the site.
- The Dirty Dam should be managed in favour of wildlife, ensuring it is kept free of non-native vegetation, reducing shading if shaded, management/introduction of native wetland plant species. The current Scottish Water proposals will achieve most of these objectives
- Undertake further surveys to determine the presence and movements of protected species to inform future protection measures. This may provide opportunities for inputs by local conservation volunteers

KEY

 Buildings and Monuments

MUGDOCK RESERVOIR

CRAIGMADDIE RESERVOIR

PR9

PR6

PR9

PR9

PR5

PR4

PR3

PR2

B9

PR11

PR7

PR2

PR1

PR10

PR8

**Milngavie Reservoirs Site Management Plan**

**Fig. 8 Property**

Scale 1:3000 @ A1



Do not scale from this drawing  
All dimensions are to be verified on site  
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# Chapter 9

## Property

### Overview

**9.1** The Milngavie Reservoirs site, which includes the Mugdock and Craigmaddie open waterbodies, together with all associated masonry structures, is Category A listed. Category A status reflects that the reservoirs site is of “national or international importance, either architectural or historic, or fine little altered examples of some particular period or style”. The reservoirs’ listed status was awarded by Historic Scotland in 1971 and upgraded from category B to A in 2008. Many of the buildings within the site are also separately listed. The designed landscape is also registered within the Inventory of Gardens and Designed Landscapes in Scotland.

**9.2** The buildings component of this section addresses the following and is referenced on **Fig 8**

- PR1 Commissioners’ Cottage (Mugdock Cottage)
- PR2 Modern Water Treatment Buildings
- PR3 Barrachan Cottage
- PR4 Barrachan Barn
- PR5 Barrachan Hall
- PR6 Craigholm House
- PR7 Craigmaddie Lodge
- PR8 Public Conveniences
- PR9 Pump Houses

**9.3** The monuments component of this section addresses the following:

- PR10 Gale’s Monument
- PR11 Bateman’s Monument

### Buildings

#### Commissioners’ Cottage (PR1)

**9.4** Commissioners’ Cottage, also known as Mugdock Cottage, is a one and two storey structure constructed in blonde sandstone with a slate pitched roof. Originally, Commissioners’ Cottage was an elegant, single storey dwelling with a symmetrical west elevation centred on the entrance porch with sash and casement windows on either side. The Commissioners’ Cottage was substantially modified and extended in 1888 and 1897. Most of the cottage assembly was adapted for operational uses which are no longer needed. The upper part of the cottage is still however a residential property and privately owned. To the east of Mugdock Cottage was an adjoining building which served as part of the Water Treatment Works. This originally had a south facing lean-to conservatory. This glasshouse has been removed and the adjoining building is now redundant.

#### Decommissioned Water Treatment Buildings (PR2)

**9.5** In the latter part of the 20th century, the water treatment process was improved, and a few additional buildings were developed in the immediate vicinity of Commissioners’ Cottage and the Straining Wells. The former conservatory was removed, and the associated masonry lean-to building and adjacent garage were incorporated within a complex of water treatment buildings which included the control room, lime silos, canteen, chlorine storage building and garage. The development of the new water treatment works in 2008 rendered these former operational buildings redundant although they still house equipment. To the south of Commissioners’ Cottage is the site of the former chlorination plant building. This has been demolished and the site recently developed as a biodiversity garden.

#### Management actions for PR1 and PR2

**9.6** It is outside the scope of this plan to examine the feasibility and business case for the redevelopment of the former Water Treatment Works and Commissioners Cottage complex. Furthermore part of the cottage is privately owned so outside Scottish Water’s control. The redundant buildings require ongoing upkeep which may be difficult to sustain indefinitely. Finding positive new uses for the future is therefore logical. They represent a strategic asset within the site with potential for new uses which could underpin their future upkeep and possible enhancements. Their location at the ‘hub’ of the site makes them ideally suited to uses for visitor facilities and interpretation. They also have the capacity to accommodate facilities for rangers and for outdoor education. It is therefore recommended that a feasibility study be undertaken to:

- Assess the condition of the buildings and identification of structural problems / risks to be addressed.
- Explore potential new uses for the redundant buildings that serve the needs of visitors and Scottish Water. This should seek to determine uses that optimise the buildings’ relationship with the reservoirs and provide a means of conserving the heritage. This exercise should ideally address the design and physical development requirements in conjunction with the business case - to establish how future uses can be financially sustainable.
- Consider how any new uses could accommodate the residents’ requirements and the implications of ownership arrangements in the future.
- Identify which if any buildings should be removed.

#### Barrachan Complex

**9.7** The Barrachan Farm complex comprises Barrachan Cottage (B3), Barrachan Barn (B4) and Barrachan Hall (B5). These were surveyed in 2006 as part of the Conservation & Recreation Management Plan but since then these redundant buildings have deteriorated significantly. Scottish Water is examining the possibility of selling the Barrachan Farm complex for appropriate uses. This will hopefully allow the buildings and adjoining area to be regenerated. Consequently, this plan has not considered management requirements for the Barrachan site.

#### Craigholm House (PR6)

**9.8** Craigholm House is located on the north bank of Mugdock Reservoir, close to the Gauge Basin. It is currently owner occupied as a private residence. It is, therefore, outside the responsibility of Scottish Water.

#### Craigmaddie and North Lodge (PR7)

**9.9** Craigmaddie/ North Lodge is a semi-detached property located adjacent to the gateway on Strathblane Road on the north-eastern side of Craigmaddie Reservoir. It is also owner occupied as two private residences. It is, therefore, outside the responsibility of Scottish Water.

#### Public Conveniences (PR8)

**9.10** The Public Conveniences are located at the top of Commissioners’ Walk adjacent to the boundary wall. This small grouping of single storey buildings was constructed in 1885 under the Extension of Works Act. The buildings are constructed of ashlar masonry of random sizes and brought to courses. The roof is slate. The main building is rectangular and has an entrance door with a projecting timber porch and a sash and casement window within the gable end. This building has a sympathetic extension which respects the proportions of the masonry structure. It is rendered with a rough textured harling and has a slate roof of the same profile as the original.

**9.11** To the rear of the main building is a small annex which was added to provide extra toilets. It was built onto the acute angle of intersecting walls and has consequently a wedge-shaped footprint. The annex has a separate entrance with screen wall.

#### Public Conveniences: Management actions

**9.12** The Public Conveniences buildings have been recently refurbished and are now in good condition. There are consequently no pressing enhancement requirements, although ongoing maintenance is required.

#### Pump Houses (PR9)

**9.13** Previously several disused pump house structures remained within the reservoirs site. Most of these small buildings of little heritage value have been removed although one remains close to the northern boundary of the site.

#### Pump Houses: Management actions

**9.14** The remaining pump house is in a dilapidated condition and may soon become unsafe although it is not generally accessible. Its condition should be monitored to determine when its demolition and removal is required.

### Monuments

#### Gale's Monument (PR10)

**9.15** Gale's Monument was erected by colleagues at the Glasgow Corporation Water Department to the memory of James Morris Gale (1852-1902) MInstCE, Chief Engineer of the Craigmaddie Reservoir and associated works. Mr. Gale was responsible for supervising the entire engineering staff under his control, and his duties included maintaining the works in perfect repair. The inscription reads "This monument was erected by the employees as a token of respect and esteem."

**9.16** This unusual granite monument dates from 1904, a time when the Art Nouveau movement was influential. It supports a cast bronze drinking bowl, complete with folds which resembles an unfurling leaf or flower. The wall-mounted plate has an inscription in upper case letters in Art Nouveau style. The bronze relief bust panel of Gale is mounted within a rough-hewn granite block. The monolithic granite block surmounts an assemblage of smaller quartz boulders, which have been haphazardly arranged. The rugged character of the monument is complemented by the Alpine plants, which grow from the crevices of the quartz boulders. 2 nr. square granite bollards frame the base of the monument.

**9.17** The water outlet at the centre of the bronze plaque has been cut off and a blanking plate fitted to cover the aperture. A crude tap has been fitted below the bronze drinking bowl to provide a water supply to the lower stone drinking bowl. The drinking cups and chains, along with the bollard chains, are lost. Except for the above lost features, the Gale's Monument is in very good repair and is structurally sound.

#### Gale's Monument: Management actions

**9.18** The historic raising of the ground level surrounding the monument has resulted in the loss of the plinth base containing the drainage grating, as well as the lower 100mm of the quartz boulders and granite bollards. Restoration of the original ground level around the monument would allow its full appreciation.

**9.19** Given the prominence and context of the drinking fountain and its specific mention in the Category A listing, its restoration is recommended so that Gale's Monument can once again be appreciated as intended. The recent introduction of a new drinking fountain in the adjacent area removes the case for reinstatement as a drinking fountain, but the sensitive replication of lost features should be undertaken in a way that prevents their removal and vandalism.

#### Bateman's Memorial (PR11)

**9.20** This memorial is dedicated to John Frederick La Trobe Bateman FRSE FRS MICE FRGS FGS FSA (30 May 1810 – 10 June 1889), the eminent Victorian engineer responsible for the design of the reservoirs and associated water supply system for Glasgow. Bateman was an English civil engineer whose work formed the basis of the modern United Kingdom water supply industry. For more than 50 years from 1835 he designed and constructed reservoirs and waterworks in the UK and overseas. Besides Glasgow, Bateman also worked on water supply systems for Belfast, Bolton, Chester, Dublin, Newcastle upon Tyne, Oldham, Perth, Stockport, and Wolverhampton, amongst many others. He carried out projects abroad as well, including designing and constructing a drainage and water supply system for Buenos Aires, and water supply schemes for Naples, Constantinople, and Colombo.

**9.21** Bateman was the first engineer of the Glasgow Corporation Waterworks Scheme, and this memorial was commissioned by the Institute of Civil Engineers to commemorate Bateman's work and celebrate 150 years since the passing of the Glasgow Corporation






Water Act in 1855. It was unveiled by the Glasgow Lord Provost and descendants of Bateman on the 24 November 2005. The memorial is prominently sited at the northern end of the causeway between the two reservoirs. It is in the form of a large boulder with a metal plaque and located in the grass at the foot of the embankment.

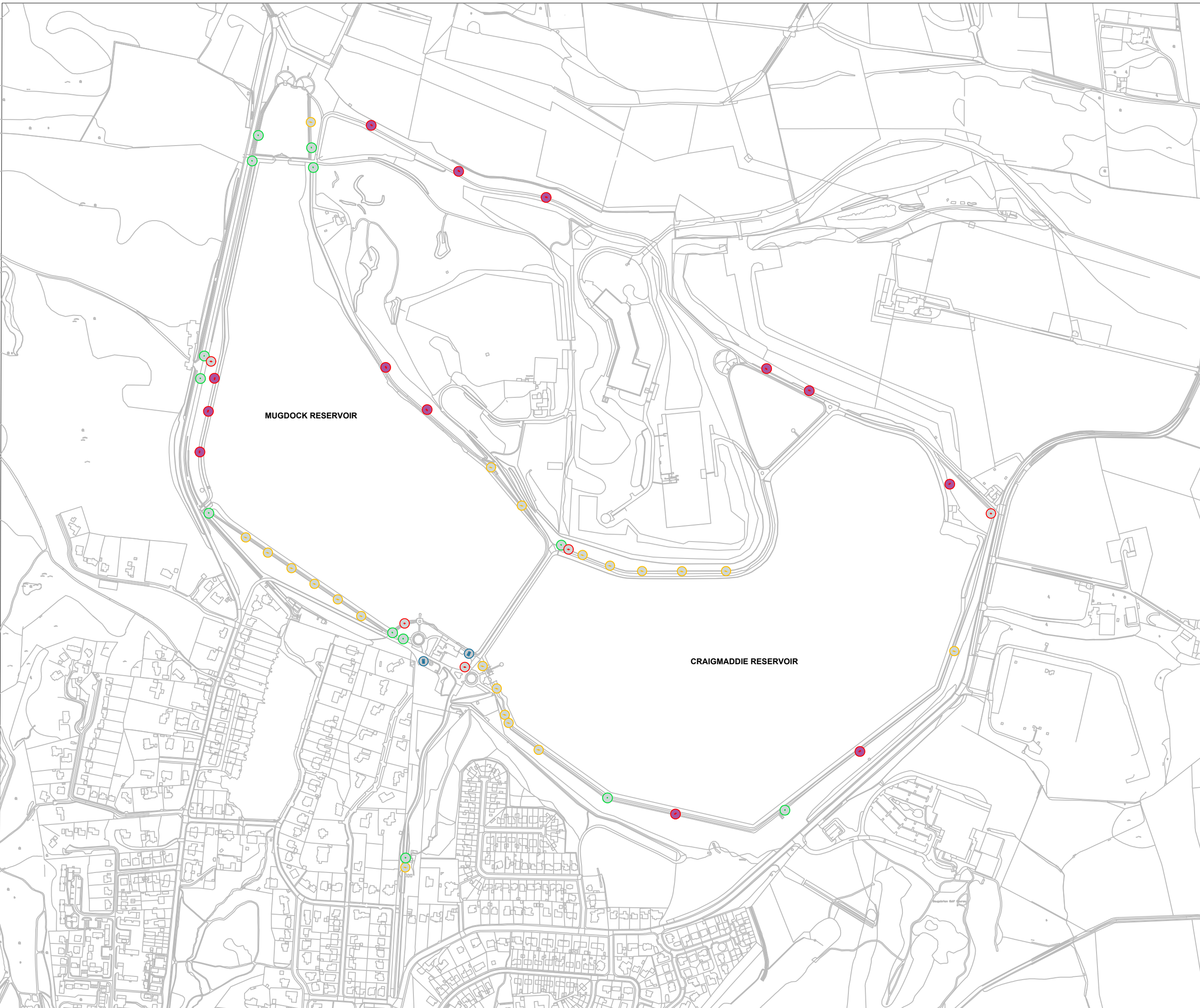
#### PR11 Bateman's Memorial: Management actions

**9.22** This memorial is relatively simple and robust with no significant requirements for maintenance or enhancements. The achievements of Bateman are however worthy of interpretation within the Milngavie Reservoir site. The potential use of the former water works buildings adjacent to the Commissioners' cottage would be an obvious site to house interpretation of the reservoir design and construction process. Cleaning of the metal plaque would be of benefit to assist in its legibility.

**9.23** Scottish Water is developing a suite of interpretive signage for the site. This could also be used to interpret the achievements of its engineers and those who constructed the reservoirs and associated infrastructure.

KEY

-  Existing Signage
-  Existing Seat
-  Existing Bin
-  Potential New Seat Locations
-  Potential Cycle Rack Introductions



MUGDOCK RESERVOIR

CRAIGMADDIE RESERVOIR

Milngavie Reservoirs Site Management Plan

Fig. 9 Furniture and Signs

Scale 1:3000 @ A1



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All dimensions are to be verified on site  
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# Chapter 10

## Furniture & Signs

### Overview

**10.1** There are several furniture and signage items within the grounds of the Milngavie Reservoirs as indicated on **Fig 9** These include:

- A variety of bench seats located around the perimeter of the reservoirs, some of which have commemorative plaques. These vary in age, style and colour and are generally mounted on a concrete base. Some of the old timber benches are becoming degraded and need refurbishment or replacement. Scottish Water is currently implementing a memorial benches policy that will help to standardise the type of bench and achieve consistency of quality and appearance.
- Litter bins are in a few strategic locations and are currently black plastic encased bins.
- Bollards are used to prevent unauthorised vehicular access in areas adjoining the road network. These are concentrated at gateway locations in the old water treatment area and in the Craigmaddie Lodge entrance area. The bollards are pale grey painted of a traditional style.
- There are currently no cycle racks within the reservoir landscape.
- Scottish Water regulatory signs are present at the main site entrances on Mugdock Road, Strathblane Road and at the entrance to the new Water Treatment Works. These include single and groupings of signs.
- A small number of information/ orientation signs are present in strategic locations. These include the Old Water Treatment Works area and the Drumclog entrance. These signs are now in poor condition and require replacement.

**10.2** Scottish Water has recently developed a signage and interpretation strategy, followed by design development to obtain Listed Building Consent to refresh and enhance signage across the site. New signs will consequently be introduced during 2023.

### Furniture: Management actions

**10.3 Benches:** Replace existing bench seats where they are inappropriate or becoming dilapidated/ unsafe. The new powder coated steel benches are robust and of style suited to the reservoir landscape. This type of bench should be introduced where replacement and new benches are required. However Listed Building Consent may be required. The latter should also confirm the approved colour for the furniture items. Bench replacements should be undertaken incrementally with respect for any commemorative benches. The latter should ideally be replaced after discussion with the donors (if known). Where donors are not known the removal of benches should be publicly notified to allow community representation. Future donations should comply with Scottish Water's Memorial policy and should aim to achieve consistency and high quality. In certain places benches without backs would be suitable, allowing views in two directions eg on the south side of Mugdock Reservoir. Additional benches strategically placed should be installed to take advantage of views but also to fit site conditions. New benches should ideally be mounted within a hard surface to avoid difficulties of maintaining grass underneath. Seating recesses at the path edge are recommended to accommodate seating without creating obstacles to pedestrian movement. Proposed locations for new benches are indicated on **Fig 9**

**10.4 Bins:** it is recommended that litter bins be located at strategic and accessible locations only, and that visitors be encouraged to take litter home. Bins should be capable of taking litter and dog waste, ideally with recycling facilities. Bins should be specified to withstand potential vandalism, including fires, and should not be accessible by gulls and crows. Essential locations for bins are:

- at car park locations within the decommissioned Water Works area, and at the toilet block
- At the Mugdock Road entrances

**10.5 Cycle racks:** the absence of cycle parking facilities should be addressed by the introduction of cycle racks within the parking areas at the decommissioned Water Works, and adjacent to the toilet block, subject to Listed Building Consent if required.

**10.6 Bollards:** the existing bollards are somewhat intrusive but perform a security/ traffic management function. There is no evident need for more bollards so the current situation may suffice. However, any future requirements for new traffic management and security measures should consider more discreet and sympathetic options.

**10.7 Information/ Interpretation Signs:** there is a need to replace and refresh visitor orientation and information signs at:

- site entrances from Mugdock Road and Drumclog Car Park
- Strathblane Road entrance at Craigmaddie Lodge
- Within the decommissioned water works area.
- Potentially at the site entrance for the new Water Treatment Works, where well used paths converge





**10.8** It is understood that Scottish Water has prepared an interpretive design package that will see the installation of waymarking and interpretive signs at numerous locations within the landscape (including those listed above)

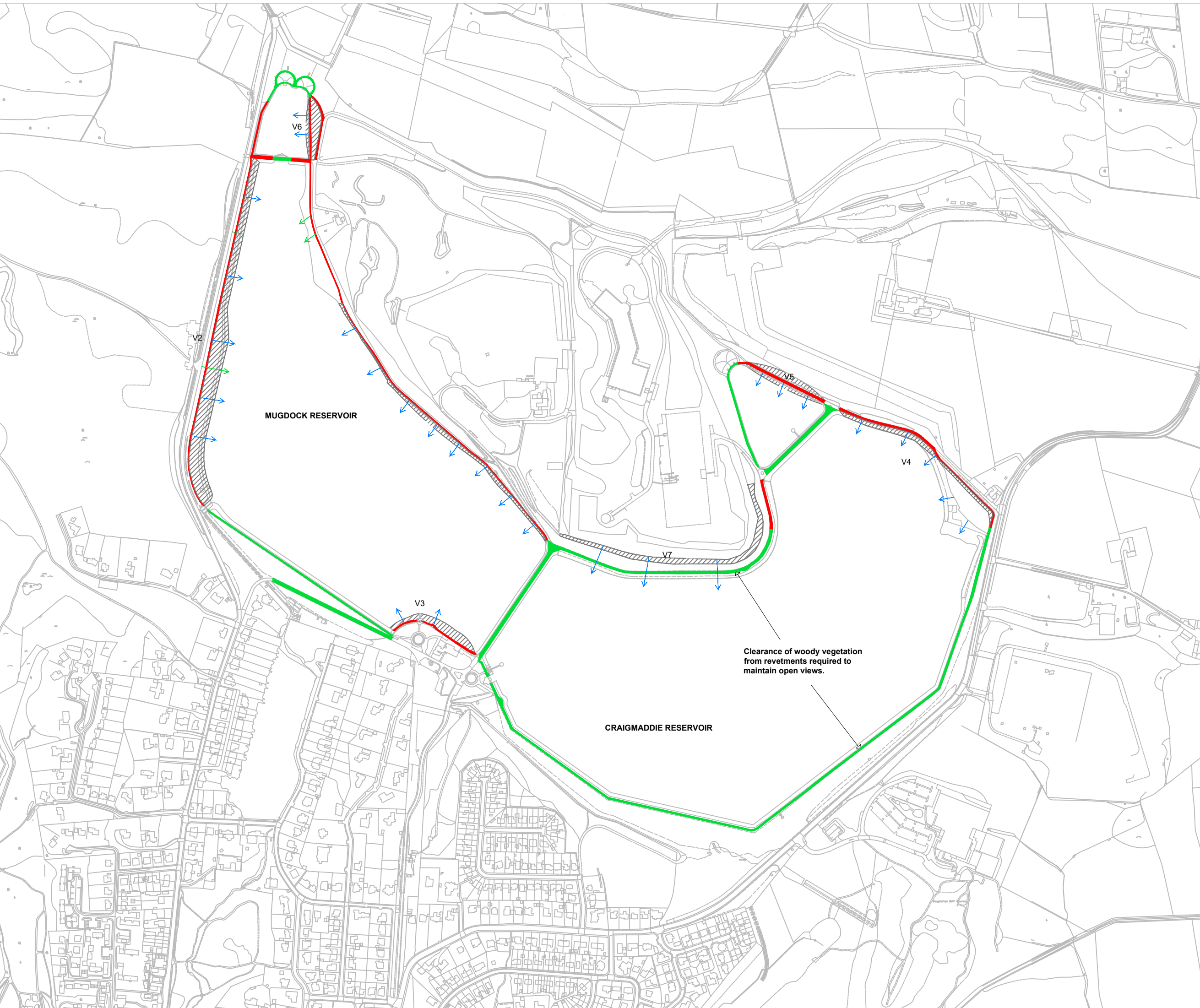
**10.9 Scottish Water Regulatory Signs:** these signs currently occupy prominent sites at entrances. but are unattractive with a collection of signs and poles. There is an opportunity to present a more positive image at site entrances by rationalising regulatory signs and displaying them as a unified suite without multiple separate sign boards.

**10.10 Aftercare of furniture & signs:** all new and existing furniture and signs should be subject to aftercare as described in the Maintenance Plan. This should include:

- Regular cleaning to remove dirt, spray, spilt liquids, graffiti, fly posters, algae and aphid dew staining from trees.
- Renewal of faded / damaged signs and illustrative material
- Repairs to damaged structures and supports.

KEY

-  Existing Blocked View
-  Largely Open View - Clearance of woody vegetation from revetments required to maintain open views.
-  Existing Gap View
-  Area with potential for views to be improved



MUGDOCK RESERVOIR

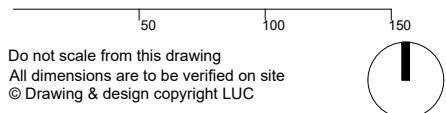
CRAIGMADDIE RESERVOIR

Clearance of woody vegetation from revetments required to maintain open views.

Milngavie Reservoirs Site Management Plan

Fig. 10 Views and Viewpoints

Scale 1:3000 @ A1



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# Chapter 11

## Views & Viewpoints

### Overview

**11.1** Since the construction of the Milngavie Reservoirs, they have been popular attractions for the residents of Glasgow and the local towns. Visitors value the landscape as a place to experience nature, to exercise, appreciate views over water and to relax. Views of the reservoir landscape have been important to these experiences as demonstrated by photographic records, postcards, and illustrations since the mid-19th century.

**11.2** Historically, popular views included both panoramas and local views of key features. The latter included the following most 'captured' features:

- Mugdock Reservoir Gauge Basin.
- Craigmaddie Reservoir Gauge Basin.
- Commissioners' Cottage and adjacent gardens.
- Commissioners' Walk.

**11.3** Popular views today include those listed above, together with the following:

- Panoramic views across Mugdock Reservoir towards the north-west with the backcloth of the Kilpatrick Hills and more distant Campsie Fells the associated agricultural landscape.
- Elevated vantage points along the reservoir dams overlooking Milngavie and the agricultural landscape to the south-west.
- The causeway between the two reservoirs is also an important vantage point for views of both reservoirs.
- Views from the high ground around Barrachan. The drive and minor paths leading to the Barrachan complex, provide a range of vantage points which offer views over the reservoirs and the landscape/townscape beyond.
- Contained / intimate views within woodland areas and in the enclosures of the Gauge Basins
- Slot views between trees around the perimeter of the reservoirs.
- Elevated panoramic views from Mugdock Road above the reservoirs to the north.

**11.4** The landscape of the reservoirs and its constituent features make important contributions to the character and visual amenity of the local area. The condition of these features consequently impacts significantly on the perception of the landscape. In this regard important features include:

- Perimeter walls, gateways, and tree avenues.
- the earth dams of Mugdock and Craigmaddie Reservoirs viewed from the lower ground and perimeter roads.

**11.5** The condition of the perimeter structures and the management of the soft landscape areas adjacent to the boundaries, therefore, contribute significantly to the image of the local landscape. Deterioration of any kind (eg. tree losses, wall failures, rusting railings, dilapidated signs) has, therefore, a negative impact on the character of the landscape.

**11.6** Early photographs of the reservoirs indicate how the site looked before the establishment of new plantings, and before the additional cover of self-seeded vegetation. These not surprisingly show a more open landscape in which soft landscape areas are highly maintained. Today the plantings of the 19<sup>th</sup> and 20<sup>th</sup> centuries have become mature and self-seeded vegetation has become well established in certain areas (particularly along the more natural edges of the reservoirs). In places views have been blocked by vegetation and there is a need to undertake clearance or localised interventions to restore or create new views

### Views: management actions

**11.7** Fig 10 illustrates where management interventions are proposed to improve views of the reservoir landscape and achieve other management objectives where possible. These are described below:

### V1 Lovers' Walk views

**11.8** Views from Lovers' Walk have become blocked by vegetation along the margin of Mugdock Reservoir. However, views could and should be created by selective pruning to remove obstructive branches and shrubs that are blocking views from the path. This would be relatively easy to achieve and would provide a number of vantage points along this popular route. Thereafter periodic visits to keep the views open would be required.

### V2 Mugdock Reservoir west bank

**11.9** The west bank of Mugdock Reservoir is colonised by a dense belt of scrub woodland which blocks views over the reservoir from the perimeter path and from the associated grass corridor. Localised clearance of the vegetation on the reservoir margin would open up views in this well trafficked area. It is recommended therefore that 3m – 5m slots c. 3m long be cut through the woodland belt to allow views across the reservoir. This could be complemented by the pruning of low branches to permit views under the tree canopies. These new viewpoints would be ideal for the siting of new benches.

### V3 Old Water Works Gardens

**11.10** Vegetation growing around the margins of the old water works are closing views over the reservoir. This includes dense evergreens (rhododendrons and laurel) which need to be cut back / reduced in height to allow views from the perimeter path and from seating within the garden area.

### V4 Craigmaddie Reservoir north margin

**11.11** Views from the paths around the north margin of Craigmaddie Reservoir are interrupted or blocked by vegetation growing on the revetments, along the outer edges of the path and in the soft landscape area to the south of Craigmaddie Lodge. Clearance of the self-seeded vegetation on the revetments will open views to the south but some additional interventions are recommended to improve views further:

- Selective pruning and crown raising of trees growing to the south of Craigmaddie Lodge to open slot views.
- Pruning and selective removal of established evergreen shrubs along the path edge – to avoid shrubs coalescing and creating an impenetrable screen.

### V5 Craigmaddie Measuring Basin north margin.

**11.12** Views from the path along the north margin of Craigmaddie Measuring Basin are largely blocked by overgrown rhododendrons which have also subsumed the parapet railing of the measuring basin. This has resulted in an enclosed alleyway between shrubs without views over the water of the basin. It is recommended to clear the rhododendrons to allow restoration of the parapet railings. This will require the removal of stumps to prevent re-growth. Reinstatement of the path margin with evergreen ground cover could provide a low maintenance treatment that retains open views.

### V6 Mugdock Measuring Basin east margin.

**11.13** The path along the eastern side of the Mugdock Measuring Basin allows views over the basin and of the headwall structures. There are however further opportunities to utilise the landscaped area to the east of the path for amenity. It currently has grassed areas enclosed by mature evergreen shrubs. Some selective clearance of shrubs could enlarge the grass spaces and open views of the basin from the east. The enlarged spaces might also be suitable for new benches or picnic tables. These grass spaces would also be suitable sites for memorial trees.

### V7 Craigmaddie Reservoir north high-level path

**11.14** Views from the high-level informal path along the top of the embankment on the north side of Craigmaddie Reservoir are currently interrupted or blocked by trees within the woodland belt. Selective pruning and crown raising of trees along this embankment



could improve views over the reservoirs and landscapes beyond. This route runs along the top of a steep embankment but is popular amongst those who know the site and appreciate the views from this high vantage point. Consequently, it might provide suitable sites for new seats where optimum views are possible. In this location more informal seating would be appropriate.

## Chapter 12

### Summary Action Plan

12.1 The following schedule provides a summary of the recommended management actions with assigned priorities and outline costs for each item. The assigned priority timescales are as follows:

- High priority items are recommended for attention within 0-5 years.
- Medium priority items within 5-10 years

■ Low priority items within 10 -20 years

REF	Summary	Cost Estimate	Priority	Comments
<b>ACCESS</b>				
Entrances				
E1	Drumclog Car park pedestrian crossing safety improvements: raised table or crossing definition by overlay by Roads Authority	N/A*	H	*Adopted road so works would have to be completed by EDC roads with appropriate approvals. Liaison with EDC on this subject is however recommended
E2	Mugdock Causeway entrance safety improvements for crossing to opposite footway: raised table or crossing definition by overlay	N/A*	M	*Adopted road so works would have to be completed by EDC roads with appropriate approvals
E3	Commissioner's Walk: Re-open pedestrian gate at entrance, if viable	Negligible	L	Local footway connections and road crossings would be required by EDC as roads authority to allow this to operate safely for pedestrians
Parking				
P1	Examine feasibility of developing a new car park on SW land west of Mugdock Road (provisional 40nr parking spaces) with access road and footway links	£15k – 20k (study estimate)	M	A new access would be required from Mugdock Road requiring roads consents
P2	Examine the feasibility of developing of a new formalised parking area close to the Water Treatment works entrance (provisionally 10nr parking spaces)	£5k -10k (study estimate)	M	Landowner consent required
P3	Amendments to disabled parking area west of Commissioner's Cottage to improve pedestrian access	£10,000	M	Potential reduction / reallocation of disabled parking required
P4	Provision of cycle parking facilities in the decommissioned Water Works area; at potential new car parks, at Mugdock Road and adjacent to the new Water Treatment works entrance.	£4800	H	Subject to feasibility study outcomes for potential new car parks
Metalled Roads				
<b>General</b>				
A1	<b>Commissioner's Walk</b> (3000m2): mostly sound although the lower section requires removal of algae/ moss	Provision £5000	M	The remedial work to metalled roads within the Reservoir Landscape as scheduled below would benefit from economies of scale, more efficient management and reduced disruption if undertaken as a single phased contract.
A2	<b>The Mugdock Reservoir ramp</b> (1500m2): cracking and wear suggests resurfacing will be required within 5years	£45,000	H	Level of wear suggests earlier action will be required for this ramp
A3	<b>Old Water Works roads &amp; parking areas:</b> proposed adjustments to disabled parking provisions as Para 2.9 to allow environmental enhancements and improve pedestrian access.	Provision £21,000	M	This area is subject to the highest levels of visitor traffic which may accelerate wear. The proposal would entail the relocation of existing disabled parking spaces.

A4	<b>Main Causeway</b> (1440 m2) footway resurfacing required ahead of carriageway	Provision £5000	M	As A1
A5	<b>Craigmaddie Reservoir north &amp; east</b> (3900m2) monitoring and programming for future repairs or resurfacing	Provision £5000	M	As A1
A6	<b>Mugdock Reservoir / measuring basin causeway</b> (480 m2): monitoring and programming for future repairs or resurfacing	£15,000	H	Level of wear suggests earlier action will be required for the causeway
A7	<b>Barrachan access road &amp; ramp</b> (2300m2): monitoring and programming for future repairs or resurfacing	Provision £3000	L	Use of the Barrachan ramp will depend on the future reinstatement of pedestrian access around Barrachan Hill and may be affected by any redevelopment proposals for the Barrachan complex of buildings. It is likely to become busy as part of the Mugdock Reservoir circuit once access is re-opened
A8	<b>Craigmaddie Lodge Access Road</b> (780m2): minimal work required	Provision £1000	L	As A1
A9	<b>Water treatment Works Access Road</b> : relatively recent road not requiring work at present		L	As A1
Unmetalled Roads				
B1	<b>Mugdock Reservoir Loop</b> : resurfacing and drainage improvements using recycled aggregate as proposed by SW	Already committed by SW	H	Most of the unmetalled routes scheduled for resurfacing, restoration of original width and drainage improvements by Scottish Water.
B2	<b>Lovers Walk</b> : as B1	Already committed by SW	H	
B3	<b>Craigmaddie Reservoir Loop</b> : as B1	Already committed by SW	H	
B4	<b>Mugdock Measuring Basin Paths</b> : as B1	Already committed by SW	H	Measuring & Gauge Basin perimeter paths & access behind the head wall were included in the LBC for this area
B5	<b>Craigmaddie Measuring Basin Paths</b> : as B1	Already committed by SW	H	Measuring & Gauge basin perimeter paths & access behind the head wall were included in the LBC for this area
B6	<b>Craigmaddie Reservoir North Access</b> : as B1	Already committed by SW	H	
B7	<b>Barrachan North Loop</b> : as B1	Already committed by SW	H	
B8	<b>Water works paths</b> : as B1	Already committed by SW	H	
Informal routes				
C1	<b>Barrachan North</b> : remove obstacles, prune low branches, remove overhanging deadwood, repair adjacent structures where unsafe, upgrade surface when footfall demands	Provision £1000	L	Use and condition of the informal routes should be monitored to determine if upgrades are required in the future.
C2	<b>Barrachan South</b> : as C1	Provision £1000	L	As C1
C3	<b>Barrachan South-East</b> : as C1	Provision £1000	L	As C1
C4	<b>Lower Craigmaddie Link</b> as C1	Provision £1000	L	As C1
C5	<b>Commissioners Walk Woodland Path</b> : as C1	Provision £1000	L	As C1
<b>MASONRY</b>				
<b>Reservoir structures</b>				
R1	<b>Mugdock Reservoir Gauge Basins</b> : removal of vegetation from the joints of the masonry structures and where it has overgrown copes/ wallheads. Repoint open joints with lime putty/ mortar	£5000	H	Timely removal of pernicious vegetation should prevent escalating damage
R2	<b>Mugdock Measuring Pond</b> : remove self-seeded saplings / scrub vegetation from the revetments (1000m2) and reset dislodged stones	£50,000	H	Priority work to limit future damage to structures and open views across the basin. This may require de-watering of the basin to provide safe working conditions
R3	<b>Mugdock Causeway</b> (200 lm both sides): repointing of open joints with lime mortar; realign displaced copes and remove self-seeded tree saplings along the length of the south-west wall	£15,000	H	Priority work to limit future damage to structures and open views across the basin. This may require de-watering of the basin to allow safe access.
R4	<b>Mugdock Causeway entrance gateways</b> : consider reinstatement of the 2nr lost monolithic pedestrian gate pillars to the south of the causeway entrance	£4000	L	



R5	<b>Mugdock Causeway, East Pedestrian Gate Pillars:</b> cleaning only	£50	L	
R6	<b>Mugdock Reservoir revetments:</b> Self-seeded trees and scrub should be removed from the revetments to allow detailed inspections. Loose and missing stones should then be re-instated in the revetment face. (1320m2)	£120,000	H	
R7	<b>Mugdock Reservoir overflow:</b> remove vegetation cover from the masonry floor of the overflow and remove any self-seeded trees from the walls. Repoint defective joints with lime mortar.	£1000	M	
R8	<b>Mugdock masonry rill:</b> clearance of vegetation from rill parallel to Mugdock Road followed by inspections (250m)	£15,000	H	High priority to allow preventative measures if required
R9	<b>Mugdock Reservoir Draw Down Tower:</b> No access: SW to inspect	N/A	L	Restricted access to the Draw Down tower requires inspections and actions by Scottish Water
R10	<b>Mugdock Reservoir Straining Well:</b> SW inspection to determine actions			SW undertaking inspections to determine the need for safety and remedial actions
R11	<b>Mugdock Masonry Header Walls:</b> No evident need for remedial works	N/A	L	
R12	<b>Craigmaddie Gauge Basin:</b> removal of vegetation from the joints of the structure and clear encroaching vegetation from ashlar copes. Repoint with lime putty where required	Provision £5000	M	
R13	<b>Craigmaddie Measuring Pond perimeter:</b> removal of self-seeded vegetation from the joints of the copes and from the revetment structures, Reset any loose stones in the revetment. Repoint with lime mortar where required (400m)	Provision £25,000	H	
R14	<b>Craigmaddie Causeway:</b> minor repairs/ repointing to reinstate defective joints between individual cope stones are required on both sides of the causeway (360m)	Provision £1500	M	
R15	<b>Craigmaddie Reservoir revetments:</b> Self-seeded trees and scrub should be removed from the revetments to allow detailed inspections. Loose and missing stones should then be re-instated in the revetment face. (20,000 m2)	£250,000	H	High priority to prevent escalating damage
R16	<b>Craigmaddie Reservoir Draw Down Tower:</b> No access: recent SW renewal of bridge and refurbishment.	N/A	L	Scottish Water has recently inspected and partially repaired the draw down tower. Further work to repair internal valves is planned.
R17	<b>Dam:</b> no evident remedials required	N/A	L	
R18	<b>Craigmaddie Draw off tower:</b> recently refurbished, no works required	N/A	L	Recently refurbished
R19	<b>Craigmaddie Reservoir overflow:</b> Removal of self-seeded rowan from cope and cut back encroaching shrubs. No significant remedials required to the masonry	£500	M	
R20	<b>Dirty Dam feeder swale:</b> Liaison with the adjacent landowner to achieve maintenance of the swale sections that run outside the boundary wall where clearance of silt and vegetation is required together with the cutting back of overhanging vegetation to allow inspection of the masonry channel and preparation of remedials proposals.	Provision £1500	M	This swale runs both inside and outside the boundary wall so liaison with the adjacent landowner is required to determine shared responsibilities. Ongoing works at the Dirty Dam by SW may include the associated channels and swales
R21	<b>Dirty Dam Outfall:</b> clearance of vegetation and silt from the outfall structure. Inspect to inform any remedials requirements	Provision £500	M	Ongoing works at the Dirty Dam by SW may include the associated channels and swales
R22	<b>Dirty Dam swale:</b> clearance of silt and vegetation from the swale & cut back self-seeded woody growth from the masonry channels and culvert arches. Inspect to inform any remedials requirements (c. 320m length)	Provision £6400	M	Access to the swale is constrained by Drumclog Road boundary walls and the incised nature of the ditch.
<b>Walls</b>				
S1	<b>Mugdock Road West outer rubble wall to drainage channel:</b> Remove the overgrown vegetation and self-seeded growth from the wall. Undertake large scale repairs/ rebuild for damaged and collapsed sections. Allow for incremental / phased completion addressing collapsed sections first (c. 25m) Total length 690m..	Provision £25,000 (£5000/ annum over 5 yrs)	M	Access may be difficult to certain sections of the wall where topography is steep.

S2	<b>Mugdock Road west: road boundary rubble wall:</b> Remove self-seeded vegetation. Removal of cement pointing and old mortar to allow comprehensive repointing with lime mortar (wall length 1050m. Wall area facing road: c1600m2)	£160,000	H	Priority due to proximity to the road and high visibility. Potential subject for phased implementation
S3	<b>Mugdock Road east:</b> road boundary rubble wall: Remove self-seeded vegetation. Removal of cement pointing and old mortar to allow comprehensive repointing with lime mortar (wall length 1065m. Wall area facing road: c1650m2). Traffic management required for work along the roadside	£200,000	H	Priority due to proximity to the road and high visibility. Costs increased by traffic management. Phased implementation
S4	<b>Lovers Walk rubble wall:</b> Remove the overgrown vegetation, fallen branches and encroaching trees from the wall. Removal of defective pointing and repoint affected areas with lime mortar where required (c. 50m2) Total length 825m/ height c. 1m)	£2000	M	Potential subject for incremental repointing over several years.
S5	<b>Lovers Walk high level wall:</b> Remove the overgrown vegetation/ fallen branches and clear trees growing close to the wall. Undertake local repairs where required (c. 20m2*) followed by phased removal of cement pointing and repointing with lime mortar. Wall length. 660m/ height c. 2m)	£4000* (repointing £35,0000)	M	Note access to high level wall may present complications. Suitable subject for phased implementation
S6	<b>North Boundary rubble wall:</b> this rubble wall is in ruins (150m) but is outside SW ownership.	N/A	L	This ruined wall is outside but connects to SW property. Responsibility for its maintenance falls with the adjacent landowner.
S7	<b>North Boundary wall:</b> this wall requires significant repairs along its length (960m x 1.6m high) . Removal of self-seeded trees, fallen trees, and trees growing in close proximity should be first undertaken to prevent escalation of damage	Provision £150,000	L	This wall is remote from public access and so could be repaired incrementally. The Dirty Dam feeder swale runs close to this wall for a significant distance (c. 200m)
S8	<b>Barrachan plateau field rubble walls:</b> Large scale repairs (c. 25%) are required to restore this wall, however priority should be placed on rebuilding unstable/ dangerous sections before more extensive remedial work. Removal of self-seeded vegetation and fallen trees should be first undertaken to prevent escalation of damage. Rebuild / repairs should use lime mortar (675m long c. 1.5m high)	Provision £45,000	M	This wall is remote from the main public access routes and so could be repaired incrementally
S9	<b>Barrachan south field rubble walls:</b> Large scale repairs (c. 30%) are required to restore this wall, This work should be Medium priority but potentially accelerated if public access is improved across the Barrachan field. (435m long c. 1m- 2m high)	Provision £30,000	M	Suitable for phased/ incremental implementation
S10	<b>Barrachan ramp retaining wall:</b> Remove the overgrown / damaging vegetation. Inspect and undertake localised repairs as required.(120m long c.0.5-1m high)	Provision £3000	M	
S12	<b>Craigmaddie north boundary wall:</b> Remove the overgrown / damaging vegetation and self-seeded growth. Remove dead trees from close to the wall and fallen trees/ branches from the wallhead. Inspect the cleared wall and undertake localised repairs as required. Recommend phased removal of cement and defective followed by repointing with lime mortar (870m x 1.5-2m high. Approx 1305m2 per elevation)	Provision £ 65,000	M	Suitable for phased/ incremental implementation
S13	<b>Strathblane Road west: road boundary rubble walls:</b> Remove overgrown vegetation and self-seeded growth. Phased repointing with lime mortar. (960m x 1.5m high Approx 1440m2 per elevation*) .	Provision £60,000*	M	Suitable for phased/ incremental implementation.
S14	<b>Strathblane Road east: road boundary rubble walls:</b> Repair damaged sections of wall as priority (c. 120m2*) damaged stone. Remove overgrown vegetation and self-seeded growth. Phased removal of defective and cement pointing, followed by repointing with lime mortar (1170m x 1.5m high. Approx. 1755m2 per elevation) .	£24,000* (£88,000 phased repointing to both faces)	H	Repairs= High priority; repointing Medium Priority
S15	<b>Strathblane Road east: outer / high level boundary rubble walls:</b> vegetation clearance required to allow detailed inspections. Extensive ( c. 30%) repairs required (330m x 1.5m high)	Provision for repairs £25,000	L	Difficult access at top of embankment

S16	<b>Mugdock ramp rubble walls:</b> Walls in generally sound condition but will require localised repairs and repointing with lime mortar in due course. (Two walls each 300m long x 1m high)	Provision £30,000	L	Suitable for phased/ incremental implementation. Traffic management will likely be required
S17	<b>Tannoch Drive boundary wall:</b> Wall in sound condition but would benefit from repointing with lime mortar in due course. (630m long x 1m high)	Provision £15,750	M	This wall is close to key public access routes and so merits early action if possible
S18	<b>Commissioners' Walk west: rubble boundary &amp; retaining walls:</b> Remove the overgrown vegetation and self-seeded growth. Undertake localised repointing with lime mortar where joints have failed causing instability ( 330m x 1m high.)	Provision £10,000	M	This wall is close to key public access routes and so merits early action if possible
S19	<b>Commissioners' Walk east: rubble walls:</b> Remove the overgrown vegetation and self-seeded growth. Undertake localised repointing with lime mortar where joints have failed causing instability (120m x 1m high.)	Provision £4000	M	This wall is close to key public access routes and so merits early action if possible
S20	<b>Commissioners 'Walk entrance gates:</b> Gateway masonry in sound condition but requires removal of cement pointing and repointing with lime mortar	Provision £2000	M	This gateway is highly visible so warrants early action if possible
S21	<b>Commissioners 'Walk old water works gateway:</b> Gateway and walls in good condition but would benefit from cleaning and repointing with lime mortar in due course.	Provision £2000	M	This gateway is highly visible so warrants early action if possible
S22	<b>Old Water Works south boundary wall:</b> Wall in sound condition but would benefit from removal of self-seeded vegetation. Undertake localised repointing with lime mortar where joints have failed causing instability (60m x 1m high.)	Provision £1500	L	
S23	<b>Mugdock Reservoir south boundary wall (with Tannoch Loch).</b> Wall in generally sound condition . Remove the overgrown vegetation and inspect to determine remedial requirements. ( 240m x 1.5m high)	Provision £3600	L	
S24	<b>Craigmaddie Lodge entrance gates:</b> Overall in good condition, areas of failed pointing require repair	Provision £500	M	
S25	<b>Lower Craigmaddie field wall:</b> Removal of overgrown vegetation and self-seeded trees which threaten the wall. Remove failed pointing and repointed with lime mortar. (585m x 1.2m high* for both sides )	Provision £24,000*	L	
S26	<b>Mugdock Road entrance gates:</b> Remove the overgrown vegetation and self-seeded growth. Removal of cement pointing and repointing with lime mortar required	Provision £2000	M	
S27	<b>Mugdock and Craigmaddie Reservoir causeway boundary walls:</b> Overall in good condition, areas of failed pointing needing repair (two walls each c. 225m x 1.5m high)	Provision £5000	H	These walls define a key public access route and so merit priority treatment
S28	<b>Craigmaddie causeway boundary walls to measuring pond.</b> Overall in good condition, areas of failed pointing needing repair c 20% of wall area (two walls each c. 180m x 1.5m high)	Provision £4500	H	These walls define a key public access route and so merit priority treatment
<b>Ironworks</b>				
<b>Ornamental cast iron parapet rails and post</b>				
OC1	<b>Mugdock Gauge &amp; Measuring Basins:</b> Replace the damaged cast iron bollard to the bridge parapet.	£5000	M	Repairs to be followed by monitoring for damage and removal of encroaching vegetation/ periodic cleaning



OC2	<b>Craigmaddie Gauge &amp; measuring basins:</b>	N/A		No repairs required presently. Monitoring for damage and removal of encroaching vegetation/ periodic cleaning
OC3	<b>Old Water Works perimeter:</b> Cut back encroaching vegetation. Repair damaged sections of rails (5m) and refurbish in grey paint to match the existing.	£800	M	
<b>Metal Strap Fences &amp; Gates</b>				
M1	<b>Mugdock Measuring Basin:</b> a) Refurbish rusted sections of the basin fencing (4m) behind the security/ H&S fencing. b) Repair damaged rails (6m) beyond gateway	a) £400; b) £900	H	
M2	<b>Craigmaddie Measuring Basin:</b> Remove the overgrown rhododendrons to expose the metal fencing. Refurbish and local repairs to fencing (160m)	£8000	H	
M3	<b>Barrachan Hill North:</b> Remove fallen trees and branches to allow re-erection of the fences and associated gates for heritage purposes	£500	M	
M4	<b>Barrachan Hill South:</b> Cut back encroaching vegetation, straighten horizontal rails and re-erect displaced gate posts (fence length 105m)	£3000	M	
<b>Ornamental iron gates</b>				
G1	<b>Mugdock Road bottom of reservoir ramp:</b> refurbished in 2022	N/A	L	Ongoing cleaning required
G2	<b>Mugdock Road Perimeter:</b> refurbished in 2022	N/A	L	Ongoing cleaning required
G3	<b>Mugdock Road Perimeter north:</b> refurbished in 2022	N/A	L	Ongoing cleaning required
G4	<b>Commissioner's Walk main gates:</b> refurbished in 2022. Consider the option to reopen the pedestrian gate	N/A	L	Ongoing cleaning required
G5	<b>Commissioner's Walk Top Gate railings (20m):</b> Repair/ reinstate the broken balusters & refurbish in colour approved by HES	£1500	H	
G6	<b>Commissioner's Walk side gate:</b> Refurbish the gate and posts in black with silver finials as per HES directions.	£500	M	
G7	<b>Craigmaddie Lodge Gates &amp; Railings:</b> refurbished in 2022.	N/A	L	
<b>Security/ Health &amp; Safety Fencing</b>				
SF1	<b>Mugdock Basin &amp; Causeway:</b> temporary dunting of overlapping fence panels (c. 2nr x 12m) to allow refurbishment of inaccessible iron parapet rails ( c. 4m)	£1200	M	
SF2	<b>Old Water works &amp; straining wells:</b> temporary dunting of overlapping fence panels to allow refurbishment of iron parapet rails inside the security cordon. Removal of Straining well fences if/ when no longer needed	£1000	M	
<b>Miscellaneous Metalwork</b>				
MM1	<b>Barrachan Northern Boundary Wall ironwork:</b> No remedial work required.	N/A		
MM2	<b>Barrachan North Dirty Dam Ironwork (mushroom) :</b> Cleaning/ removal for accumulated vegetation to allow inspection	N/A	L	Refurbishment recently completed during the writing of the plan
MM3	<b>Barrachan North Dirty Dam railing remnants:</b> Completion of vegetation clearance to allow inspection of remaining railings	N/A	M	Vegetation clearance should be included within the current Dirty Dam remedials work by SW
<b>Trees &amp; Woodlands</b>				
<b>Woodland Belts &amp; Tree Groups</b>				

WB1	<b>Mugdock Gauge Basin:</b> removal of any hanging trees and dead wood plus the selective removal of self-seeded trees followed planting of replacement specimen trees into clearings. (5000m2)	Prov £2500	H	Repeat actions will be required as maintenance
WB2	<b>Woodland Walk:</b> removal of any hanging trees and dead wood plus the selective removal of self-seeded trees followed planting of replacement specimen trees to match original species mix (10,000m2)	Prov £5000	H	Repeat actions will be required as maintenance
WB3	<b>Mugdock Road Entrance Woodland:</b> fell selected self-seeded species to create clearings for replacement planting. Create clearings to promote ground and introduce understorey species as WB3 proposal.	Prov £2000	H	
WB4	<b>Barrachan Farm Shelterbelt:</b> management and a replanting programme using species listed in WB4 proposal	Prov £500	L	
WB5	<b>Barrachan Farm Field Boundaries:</b> replace lost trees c. 5nr	£600	L	
WB6	<b>Barrachan Entrance Drive:</b> tree surgery to remove dead & crossing limbs	Prov £1000	M	
WB7	<b>Craigmaddie Reservoir plantation:</b> management to perpetuate tree cover and provide successional growth (5000m2)	Prov. £1000	M	Maintenance item
WB8	<b>Old Water treatment works:</b> management to perpetuate tree cover and provide successional growth	Prov £1000	M	
WB9	<b>Commissioner's Walk woodland:</b> remove dead, leggy trees and reduce overcrowding. Replant gaps	Prov £2000	M	
<b>Tree Lines</b>				
TL1	<b>Austrian &amp; Scots Pines:</b> tree surgery to maintain safe conditions. Replacement planting in gaps. Prov 10nr	£1500	H	
TL2	<b>Common Limes:</b> tree surgery and replacement planting if required	Prov £500	L	Trees in good condition should not require significant interventions
TL3	<b>Strathblane Road tree avenue:</b> tree surgery and replacement planting to fill gaps	Prov £2500	H	Priority due to proximity to the road and high visibility
TL4	<b>Commissioner's Walk:</b> tree surgery and replacement planting to fill gaps	Prov £1000	H	
TL5	<b>Horse chestnut:</b> replacement planting to fill gaps (4 nr)	£600	H	
TL6	<b>Cedars:</b> introduce replacement Cedars maintaining access (3nr)	£600	M	
TL7	<b>Masonry Rill:</b> management	Prov £200	L	
<b>Individual Trees</b>				
T1	<b>Noble Firs:</b> no immediate actions	0	L	
T2	<b>Sentinel Yews:</b> remove competing holly from southern Yew area. Amend car park to improve pedestrian access around the northern yew	£500	M	
<b>Memorial Trees</b>				
MT1	<b>SW to supplement its Memorial Strategy to incorporate the proposals in this plan once approved.</b>	Strategy revisions/ publication £2k	H	Details on tree planting locations and potential memorial 'record' to be developed following SW approvals
<b>Ornamental Plantings</b>				

Horticultural Components				
H1	<b>Mugdock Road boundary:</b> Rhododendron management actions and restocking (for approximately 1/3 total area c. 2700m2)	£10,000	H	
H2	<b>Mugdock Reservoir Gauge Basin:</b> Rhododendron management actions and restocking with Prunus lusitanica (for approx. ¼ total area c. 2000m2)	£7500	M	
H3	<b>Mugdock Measuring Pond:</b> removal of alternate shrubs and hard pruning of the remaining perimeter shrubs (400m2)	£6000	H	
H4	<b>North Walk:</b> enhance Rhododendrons on north of the path (2400m2)	£18,000	H	This work would complete and complement the recent work on the Dirty Dam / North Walk corridor
H5	<b>Dirty Dam:</b> establish wildflower verge where shrubs have been removed next to the Dirty Dam (900m2)	£9000	H	
H6	<b>Craigmaddie Reservoir Gauge Basin:</b> commence incremental replanting of the existing shrubs with like for like species (125m2)	£2500	M	
H7	<b>Craigmaddie Measuring Pond:</b> remove overgrown shrub belt (included in M2) and replant with evergreen ground cover (450m2)	£6750	H	
H8	<b>Craigmaddie Lodge Drive:</b> first phase of replanting incl removal of inappropriate planting	£660	M	
H9	<b>Old Water Treatment works:</b> reintroduce horticultural interest following removal of security fences	£2000	L	
H10	<b>Barrachan Entrance Drive:</b> regenerate and replant to respect the original planting composition (150 m)	£3000	L	
<b>Biodiversity</b>				
BD1	<b>Targeted rhododendron control in woodlands</b>	N/A		Maintenance action; Suited to a rolling programme of clearance year on year
BD2	<b>Woodland enhancements:</b> creation of glades and rides	N/A		Maintenance action; Suited to a rolling programme of glade creation and clearance
BD3	Targeted restoration: planting for protection of high value ground flora	Prov. Sum: £20k	L	
BD4	<b>Introduction of management for neutral grasslands:</b> cutting or grazing regime removing arisings	N/A		Maintenance action
BD5	<b>Reservoir Embankment mowing regime changes:</b> to introduce meadow grass areas	N/A		Maintenance action
BD6	<b>SW has developed an interpretation strategy and proposals for site signage . These signs are due for installation during 2023 and should provide information on the landscape heritage, access and site constraints.</b>	N/A		Costs committed by SW
BD7	<b>Improve habitat connectivity:</b>	N/A		Maintenance action
BD8	<b>Remove cut grass to promote wildflowers / enhance biodiversity</b>	N/A		Maintenance action- likely to require some revisions to existing maintenance regime incl increased costs
BD9	<b>Retention of deadwood and creation of wildlife habitats:</b> cut logs, brash and stone piles	N/A		Maintenance action. Requires repetition and maintenance in the future
BD10	<b>Fence repairs to assist deer proofing in valuable parts of the site</b>	Incl in metalwork		As covered in Metalwork & Structures proposals
BD11	<b>Maintain Dirty Dam for wildlife</b>	N/A		Maintenance action



BD12	<b>Undertake further surveys to determine the presence and movements of protected species to inform future protection measures.</b>	£10- 15k (survey estimate)	M	Local conservation volunteers may also be able to assist with wildlife surveys and monitoring
<b>Grasslands</b>				
OL1	Upgrade/ recondition ornamental / formal lawns in conjunction with improvements to ornamental plantings	N/A	M	Maintenance action
AG1	Introduce wildflower seed and plugs to top section of embankment north of Craigmaddie Reservoir (c. 3000m2) and change mowing regime	£15,000	M	Change mowing regime once wildflowers / meadow grass is established
AG2	Introduce wildflowers to area at the east end of Craigmaddie Reservoir (c.2000m2)	£10,000	M	Change mowing regime once wildflowers / meadow grass is established
AG3	Introduce bulbs to rear margins of Commissioners Wlk grasslands (3000m2)	£18,000	M	
MG1	Introduce grassland maintenance to enhance biodiversity	N/A	M	Maintenance action
<b>Property</b>				
<b>Buildings</b>				
PR1	<b>Commissioner's Cottage &amp; associated water treatment buildings:</b> undertake feasibility study to determine how the old water treatment works buildings and Commissioner's Cottage could be used in the future for estate management & visitor facilities/ interpretation	Study estim: £30,000- £40,000	H	This would require a commission of appropriate specialists incl: architect/ conservation specialist/ engineer/ QS/ economist NOTE: Part of the Commissioner's Cottage remains in private ownership and in residential use
PR2	<b>Modern Water Treatment Buildings:</b> undertake feasibility study to determine how the former water treatment buildings could be used in the future for estate management & visitor facilities/ interpretation	Incl in above	H	As above
PR3	<b>Barrachan Cottage:</b> not included	Not required		The Barrachan Farm complex is the subject of a development project therefore not considered by this project
PR4	<b>Barrachan Barn:</b> not included	Not required		As above
PR5	<b>Barrachan Hall:</b> not included	Not required		As above
PR6	<b>Craigholme Cottage:</b> not included	Not required		In private ownership
PR7	<b>Craigmaddie Lodge:</b> not included	Not required		In private ownership
PR8	<b>Public Conveniences:</b> no actions currently required	0		
PR9	<b>Pump House:</b> Its condition should be monitored to determine when its demolition and removal is required (provision for demolition & clearance)	Provision £5000	M	
PR10	<b>Gale's Monument:</b> refurbishment of the monument incl reinstatement of original ground levels, pruning of overhanging trees and replacement of lost features	Estim £10,000	M	
PR11	<b>Bateman's Memorial:</b> Clean the metal plaque	£20	H	Interpretation of Bateman's work should ideally be accommodated on site, eg within a building dedicated to interpretation of the reservoirs' design and construction
<b>Furniture &amp; Signs</b>				

F1	<b>Replacement Benches:</b> Replace existing bench seats where they are inappropriate or becoming dilapidated/ unsafe (Provisional 10 nr at c.£1500 each supply and install at current prices)	£15,000	H	All new benches should be of a consistent design & quality including memorial benches (prices based on products by David Ogilvie Engineering as used by SW)
F2	<b>New Benches:</b> install new benches to take advantage of views with seating recesses and hard bases (provisional 10 nr at c.£1500 each supply and install at current prices)	£15,000	H	All new benches should be of a consistent design & quality including memorial benches (prices based on products by David Ogilvie Engineering as used by SW, but vary by supplier)
F3	<b>Bins:</b> install bins at strategic locations where absent (5 nr at c. £1000 each supply and install )	£5000	M	Any development of new parking areas will require the inclusion of bins (prices based on the anti-vermin bin by David Ogilvie Engineering but vary by size, specification & supplier)
F4	<b>Cycle racks: introduce cycle racks in parking areas (Provisionally 16 nr)</b>	£3200	M	Any development of new parking areas will require the inclusion of facilities for cyclists
F5	<b>Bollards:</b> review the need for bollards and rationalize if possible	TBC	L	
F6	<b>Information/ interpretation signs: SW has developed an interpretation strategy and proposals for site signage. These signs are due for installation during 2023 and should provide information on the landscape heritage, access and site constraints.</b>	N/A		Interpretation signage is due for imminent installation.
F7	<b>SW Regulatory signs:</b> rationalize number of signs and improve presentation / quality of mounting structures ( <b>4nr sites</b> ) SW advise that this is in progress.	N/A		In progress
<b>Views &amp; Viewpoints</b>				
V1	<b>Lover's Walk views:</b> selective pruning to remove obstructive branches and shrubs	Provision £3000	H	
V2	<b>Mugdock Reservoir west bank:</b> cut 3nr – 5nr slots c. 3m long be cut through the woodland belt, plus pruning of low branches to permit views under the tree canopies.	£5000	H	These new viewpoints would be complemented by the siting of new benches as F2 above
V3	<b>Old Water Works Gardens:</b> cut back perimeter shrubs / reduce in height to allow views from the perimeter path and from seating within the garden area.	Prov £500	H	This operation will require repetition every 2-3 years
V4	<b>Craigmaddie Reservoir north-east margin:</b> Selective pruning and crown raising of large trees retained along the north-east margin	Provision £10,000	H	Removal of trees from the engineered revetment included under R15
V5	<b>Craigmaddie Measuring Basin north margin:</b> clear rhododendrons (as in M2 and H7)	Incl in M2/ H7	H	
V6	<b>Mugdock Measuring Basin east margin:</b> enlarge the grass spaces and open views of the basin from the east.	Prov £2000	M	
V7	<b>Craigmaddie Reservoir north high-level path:</b> Selective pruning and crown raising of trees along this embankment	Prov. £5000	M	

## Cost Estimate Summary

12.2 From the above table it is possible to estimate the potential cost of works by level of priority:

- High Priority Items: **£1,104,470** + 20% allowance for contingencies / prelims and inflation would total c. £1,325,364.00 + VAT (average c. £265,000 per annum over years 0-5 incl)

- Medium Priority Items **£602,610** + 25% allowance for contingencies / prelims and inflation would total c. £753,326.50 + VAT (average c. £150,652 per annum over years 6-10 incl)
- Low Priority items: **£273,950** + 30% allowance for contingencies / prelims and inflation would total c. £356,135 + VAT (average c. £36,000 per annum over years 11-20 incl)

**12.3** Shifting items to lower priorities or extending the programmes could reduce the annual spends for the High and Medium priority items if required.