



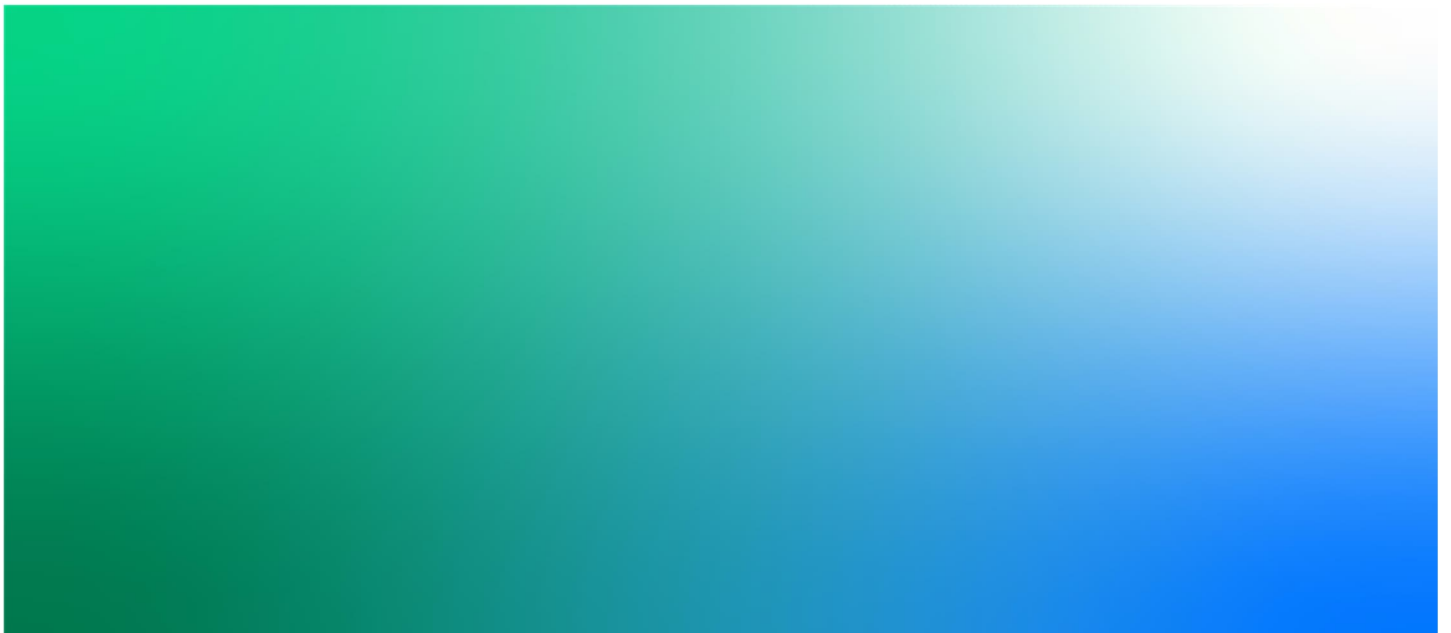
Rochdale and Littleborough Flood Risk Management Scheme (FRMS) - Littleborough Phase 1B

Invasive Non-Native Species Management Plan

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1. Introduction

1.1 Background

Jacobs were instructed by the Environment Agency (EA) to produce a detailed management plan giving details of measures to be taken to control the spread of invasive plant species for the Littleborough Phase 1b section of the Rochdale and Littleborough Flood Risk Management Scheme. In order to fulfil Planning Condition 10 of the planning application (REF. 22/00485/FUL), this document will be submitted and approved by the Local Planning Authority, and development shall be carried out in accordance with this management plan.

An Extended Phase 1 Habitat survey was carried out in summer 2019 by Jacobs (Jacobs, 2019) which identified the presence of invasive species within the proposed works and mandated that an invasive species method statement be produced to prevent the spread of invasive species during works. This document is the invasive species management plan and is informed by all surveys undertaken to date.

1.2 Potential Impacts

Invasive Non-Native Species (INNS), sometimes referred to as 'invasive alien species', are those non-native species that have the ability to spread rapidly and become dominant in an area or ecosystem, causing adverse ecological, environmental, and economic impacts. INNS can also affect our health.

Examples of the negative effects caused by invasive non-native species include economic cost, structural damage, environmental degradation, aesthetic degradation, biodiversity loss, loss of land function, access restrictions and increased risk to human and animal health and safety. Costs incurred because of invasive non-native species can include repairs to damaged structures and environment, delays to works, loss in value of a landholding or other assets, potential for prosecution because of damage caused by invasive species or infringement of legislation. There is also a risk of loss of reputation through mismanagement of invasive species.

The Extended Phase 1 Habitat survey identified the presence of Japanese knotweed (*Reynoutria japonica*), Himalayan balsam (*Impatiens glandulifera*), Japanese Rose (*Rosa rugosa*), Rhododendron (*Rhododendron ponticum*) and Cotoneaster (*Cotoneaster spp.*). Construction activities have potential to cause the spread of these invasive species. Japanese knotweed also has potential to damage newly constructed defences.

1.3 Aims and Objectives

The aim of this report is to identify the locations of invasive non-native plant species within the proposed works and recommend mitigation measures as appropriate.

1.3.1 Limitations

Best efforts have been made to identify all locations where invasive species are present however it is possible that some locations may have been overlooked or the species have spread since surveys were undertaken. Caution should be taken when clearing vegetation and all site operatives are to be made aware of the appearance of invasive species through toolbox talks that are to be delivered prior to works commencing. If in any doubt about the presence of an invasive species stop works and contact an ecologist.

2. Legislative and Policy Framework

The construction and operational activities for the proposed works must comply with the UK nature conservation legislation, and with national and local biodiversity policies.

2.1 Wildlife and Countryside Act 1981 (as amended)

Under this legislation it is the landowner or land manager's responsibility to prevent the planting or otherwise causing to grow in the wild of any non-native plant or spread of any non-native species out of its native range.

Anyone convicted of an offence under Section 14 of the Wildlife and Countryside Act 1981 (as amended) may face a fine of £5,000 and/or 6 months imprisonment, or 2 years and/or an unlimited fine on indictment.

2.2 Environmental Protection Act 1990

Soils containing Himalayan balsam seeds or Japanese knotweed material are classified as controlled waste under Part II of the Environmental Protection Act (EPA, 1990). Controlled waste should be disposed of safely at a licensed landfill site by a licenced carrier in concurrence with the EPA (Duty of Care) Regulations 1991.

2.3 Other Legislation

The Control of Pesticides Regulations 1986 require any person who uses a pesticide to take all reasonable precautions to protect the health of human beings, creatures and plants, safeguard the environment and in particular avoid the pollution of water. For application of pesticides in or near water approval from the Environment Agency should be sought before use.

Waste must be transferred to an authorised person (a registered carrier or person exempted from registration by the Waste (England and Wales) Regulations 2011 (Waste Regulations). A waste transfer note must be completed and signed giving a written description of the waste as per regulation 35 of the Waste Regulations. This must be sufficient to enable the receiver of the waste to handle it in accordance with their own duty of care. Failure to comply with these provisions is an offence.

The Hazardous Waste Regulations 2005 (HWR 2005) contain provisions about the handling and movement of hazardous waste. Hazardous wastes are defined by reference to regulation 6 of the HWR 2005. A waste is a hazardous waste if it is listed as a hazardous waste in the List of Wastes Decision as well as the List of Waste (England) Regulations 2005. The Secretary of State is also able to decide if a particular batch of waste is to be determined as hazardous. Schedule 3 of the HWR 2005 includes a list of properties that render waste hazardous. Annex I, II and III of the EU Hazardous Waste Directive also provides further guidance on what constitutes hazardous waste.

3. Ecology of Invasive Non-Native Species (Plants)

3.1 Japanese Knotweed

Japanese Knotweed is a tall, perennial, non-native and invasive species, which was introduced to Britain in 1825 as an ornamental plant. The species has now become established over much of the UK, and is commonly found along watercourses, road verges, railway embankments, and on waste ground (Booly et al., 2008).

Japanese knotweed is a green leaved plant which grows up to 3m tall. It has shield-shaped leaves with a flattened base and creamy white flowers. The stems of Japanese knotweed are hollow and are green with red speckles in the summer and orange/brown in winter. It often forms dense bushes of bamboo-like stems. In winter it dies back, sometimes leaving standing dead canes.

The plant spreads entirely by rhizomes and even a small fragment of rhizome can regenerate new plants. The underground rhizome system may reach a depth of 3m and extend up to 7m away from a parent plant. Rhizomes range from 5 to 100mm in diameter and are reddish to dark brown on the outside and a distinctive orange colour on the inside.

Works in an area containing Japanese knotweed can cause further spread of Japanese knotweed through disturbance of the plant (and its root system) by movement of people and machinery.

3.2 Himalayan Balsam

Himalayan balsam is an annual species that grows up to 3m in height, with characteristic bright pink flowers and is found primarily on riverbanks. Flowers can range from white to purple and appear from June to October. Himalayan balsam reproduces by seeds, which remain viable in the seed bank for at least two years (Booly et al., 2008).

Himalayan balsam forms dense stands on the riverbanks which then die back over winter, consequently encouraging river-bank erosion. Himalayan balsam can also reduce biodiversity by increasing shading for other species.

3.3 Rhododendron

Rhododendron is an invasive non-native woody shrub species. It was first introduced in the late 18th Century and was planted for its ornamental value and as cover for game (Booly et al., 2008).

Rhododendron reduces the biodiversity value of a site and hinders woodland regeneration. Rhododendron can also act as a host for the fungus-like pathogen *Phytophthora ramorum* (otherwise known as Sudden Oak Death). Rhododendron has the potential to spread this virulent plant disease which negatively impacts woodland structure and biodiversity.

3.4 Japanese Rose

Japanese rose is a species native to East Asia and has been growing in the UK since the mid 19th century, often planted in gardens and parks. It has the ability to spread via seeds which are distributed by birds and mammals, and the plant suckers readily forming dense thickets (Booly et al., 2008).

Japanese rose is capable of forming dense thickets where few other plants can grow, and can invade valued natural and semi-natural habitats.

3.5 Cotoneaster

Cotoneaster are a family of deciduous to semi-evergreen procumbent and upright shrubs bearing small green leaves and small pink to white flowers in May followed by red fruits in the autumn (Booly et al., 2008). It is spread in the wild through seeds which are spread through bird droppings after birds have fed on the berries. Cotoneaster are commonly used as cover planting in urban environments around buildings and driveways, and also planted in

gardens. There are over 100 cotoneaster species known to be present in the UK, however only the six most common and widespread are listed as Schedule 9 species. When it invades semi-natural habitats of high conservation value it can spread rapidly and outcompete native vegetation.

3.6 Variegated Yellow Archangel (*Lamium galeobdolon* subsp. *Argentatum*)

Anecdotal evidence has been provided of variegated yellow archangel within the Gale West site. This species is native to parts of Europe and Asia. It produces spreading stems with variegated leaves and whorls of yellow two-lipped flowers. It's ability to rapidly spread and form dense mats of vegetation which can outcompete other plant species.

4. Status on Site

Locations of the invasive plant species recorded during the extended Phase 1 Surveys in 2017 and 2019 are presented in Table 1 below and marked on the Invasive Species Map (Figure 1 - IMNW000100-JAC-ZZ-4B0-DR-EN-1228). The species recorded during the walkover survey include Japanese knotweed, Himalayan balsam, Japanese rose, Rhododendron and Cotoneaster. Himalayan balsam was the most frequent species recorded, identified in large quantities along multiple sections within the proposed works area. Japanese knotweed and Rhododendron were identified in a smaller number of locations. Japanese rose and Cotoneaster were recorded the least, in isolated areas.

Table 1 Locations of invasive species within the proposed works area.

Species (common name)	Notes
Himalayan balsam	Himalayan balsam was noted throughout the 2017 survey area. Himalayan balsam was recorded throughout the survey area at Grove Lodge. Himalayan balsam was recorded on the banks of Ealees Brook.
Japanese knotweed	Japanese knotweed was noted within the Gale West area.
Rhododendron	Recorded in low frequencies within the Littleborough Rhododendron was recorded within Gale East and west of Gale West.
Japanese rose	Recorded within the Littleborough Works Extent, Gale, only.
Cotoneaster	Rarely recorded and was mostly planted near housing developments.

4.1 Management Objectives

The objectives of this management plan are to:

1. Prevent the spread of invasive species during construction works; and
2. Monitor the site and control any re-growth.
3. Eradicate discrete isolated populations of schedule 9 species from the scheme

4.2 Pre-construction Considerations

Using the figures in this report, areas where non-native species have been identified as a risk of being introduced, spread within, or moved off site should be marked for mitigation measures. Consider phasing the development to allow time to deal with the presence of non-native species and ensure non-native species and locations (mapped) are incorporated within all relevant site method statements. Where a species requires long-term management (e.g. Japanese knotweed), ensure a long term site method statement is followed.

4.2.1 Environmental clerk of works

The measures outlined below will apply at all stages of construction works. These measures require specialist knowledge, so the contractor must employ a suitably qualified and experienced ecologist for the duration of the construction works. The role of the ecologist is to assist the contractor with the interpretation and implementation of the management measures outlined in this document. The contractor will liaise with their ecologist prior to the commencement of construction works to ensure that these management measures can be incorporated into the construction schedule. The ecologist will review the method statements of all contractors in order to ensure that they are consistent with the management strategy. They will visit the site on a regular basis during construction works and will keep a written record of the measures that have been implemented. However, they will not need to have a permanent presence on site.

4.2.2 Exclusion zones

Where vegetation can be retained, exclusion zones should be set up around each of the identified INNS locations. Japanese knotweed rhizomes can extend for 7m and therefore a buffer of 7m should be used when creating exclusion zones around this species. Exclusion zones for Himalayan balsam, Rhododendron, Cotoneaster and Japanese Rose should be determined on a case-by-case basis to avoid accidental spread of these species caused by the works.

In addition to the above, signage should be erected to indicate where contaminated soil, materials or water are located.

4.2.3 Cleaning of contaminated vehicles and clothing

Good site hygiene should be maintained when dealing with any INNS. These measures will help to ensure that the INNS are not spread by machinery or personnel and should be followed:

- Personnel working on or between sites should ensure their clothing and footwear are cleaned where appropriate to prevent spread;
- Tracked vehicles should not be used within the area of infestation;
- All vehicles leaving the infested area and / or transporting infested soil/materials must be thoroughly pressure-washed in a designated wash-down area before being used for other work;
- Where cross-contamination is possible (i.e. from one site to another), consider designating vehicles or machinery to specific sites where possible to prevent spread;
- Material / water left after vehicles have been pressure-washed must be contained, collected and disposed of appropriately;
- All chemicals used for the control of non-native species should be stored and used in a responsible manner; and
- All wash facilities including wastewater from washing vehicles, equipment or personnel should be managed in a responsible way so as not to cause harm to the environment.

4.3 Japanese Knotweed

4.3.1 Treatment

The Environment Agency set out guidance for treatment options for Japanese knotweed in “the knotweed code of practice: Managing Japanese knotweed on development sites” (EA, 2013). A flow chart approach for selecting treatment options is used and is summarised below.

If possible, treat Japanese knotweed on site, in situ, with herbicide over a suitable period of time (usually 2-5 years). If in-situ treatment is not an option, then soil containing Japanese knotweed can be buried on site until it dies (cell burial). It may be necessary to bury the material 5m deep, or at 2m if a root barrier membrane is used. If local conditions mean that burial on site will not be an option, then you may create a Japanese knotweed bund (dig and relocate). The purpose of the bund is to move the Japanese knotweed to an area that will not be used to allow extra time for treatment. If none of the previous options are possible then off-site disposal (by incineration or landfill) should be used (dig and dump). However, this should be treated as a last resort. Where on-site burial is adopted, this will be mapped and recorded by the environmental clerk of works and the location will be communicated to future land owners.

Works will be undertaken in such a way, as to prevent the spread of Japanese knotweed but will not be able to eliminate it. It is however recommended that where works leave stands of Japanese knotweed in place that a treatment plan is devised. Stands of Japanese knotweed can be treated with herbicide by a competent and qualified person. Only certain herbicides are suitable for use near water. The most effective time to apply herbicide treatments to Japanese knotweed is from July to September. Treatment would need to continue for at least 3 years.

4.3.2 Root barrier membrane

As proposed works will be situated within 7m of Japanese knotweed stands it is recommended that a root barrier membrane be installed during constructions to prevent rhizomes from spreading and potentially penetrating new structures. Installation of the root barrier membrane should be supervised by an expert and should not allow material to pollute the adjacent watercourse; or contain chemicals that may leach into it. Root barrier membranes need to be buried at least 2m deep to prevent damage from burrowing mammals.

4.3.3 Cutting Japanese knotweed canes

It may be necessary to cut Japanese knotweed canes to facilitate works. Cut stems should be allowed to dry out and turn brown. Cut stems should be left on an appropriate membranous surface, not on soil or grass. Once stems have dried to a brown colour, they are dead. This is not the case for crown material or rhizome material. Stems can be left on site after cutting if they are big enough that they will not blow away, there is no risk they will enter a watercourse and the stem has been neatly cut near its base using a cutter, hook, or scythe. Strimmers and other mechanical tools should not be used for cutting.

4.3.4 Excavating material

Excavating Japanese knotweed should be used as a last resort. If material is to be disposed of off-site, great care should be taken to avoid excess waste and to ensure Japanese knotweed does not contaminate surplus soil. Soils can be screened or sieved to remove rhizomes before re-use on site, however the screened soil must still be regarded as potentially containing viable knotweed rhizome. The measures set out above in regard to cleaning of machinery and clothing must be followed to prevent spread of knotweed during excavation. If required, excavated material should be stored on a root barrier membrane, in an area that will remain undisturbed, and clearly signed.

4.3.5 Contaminated topsoil

If soil has been treated for and is free from Japanese knotweed it can be re-used on site without the need for a waste management license or an exemption. If taken off site, this material must be disposed of in a licensed landfill. Developers reuse treated soils at their own risk, and they should be re-used in a restricted area, rather than spread across the site, but this should be recorded in an ongoing method statement and inspected/treated accordingly.

Any topsoil brought onto site should be under consideration, as it can easily introduce a non-native species along with it, particularly Japanese knotweed.

Section N.6.4.5 of BS 3882:1994, the British Standard for topsoil clearly states that it is critical that material should be free from Japanese knotweed propagules, rhizome, and vegetative fragments.

4.4 Himalayan balsam

4.4.1 Removal

Himalayan balsam can be uprooted by hand when present in small areas. Hand pulling should only take place between April and early June, before the plant has flowered (Booly et al., 2008).

Strimming of dense areas of Himalayan balsam can be undertaken to prevent re-growth and flowering. Strimming should only take place before the plant has flowered. If strimming balsam, all stems must be completely severed below the lowest node or joint.

4.4.2 Disposal

Where possible Himalayan balsam can be disposed of on site, providing there is a suitable area for it to be placed and left to compost or covered with a tarpaulin to prevent regrowth. If transported off site, it will need to be transported as hazardous waste and taken to an appropriate waste facility.

4.4.3 Contaminated soils

Areas dominated by Himalayan balsam such as areas of Grove Lodge, a soil management strategy which avoids using the top soils (top 10cm) should be adopted when reinstating/soft landscaping to maximise establishment of new native planting and habitat creation outcomes at site.

4.5 Rhododendron

4.5.1 Removal

Small bushes and small seedlings can be pulled by hand when present in small areas. Larger rhododendron bushes can be manually cut, the top woody growth of rhododendron can be manually removed to leave cut stumps with no remaining alive branches or shoots. A cut stump technique should then be applied to the remaining stumps by applying an approved herbicide to the surface of a stump on the same day of cutting (Edwards, 2006).

4.5.2 Disposal

Where possible cut woody material of rhododendron can be removed to a safe area and chipped on site. Chips can be left on site or bagged and removed. Any rhododendron removed off site will need to be transported as controlled waste and taken to an appropriate waste facility.

4.6 Japanese Rose

4.6.1 Removal and disposal

Cutting stands back over a number of years can reduce infestations and root systems can be excavated however it is important that all the root system is removed. Excavated and cut material must be disposed of at a licenced landfill as controlled waste (Booly et al., 2008).

4.6.2 Chemical control

Herbicide application can effectively control infestations and prevent stands from spreading.

4.7 Cotoneaster

4.7.1 Removal and disposal

Young seedlings can be effectively pulled however larger plants will develop multiple stems from the large root mass making it difficult to remove the whole plant. Root mass can be excavated to remove the entire plant and prevent regrowth. Excavated and cut material must be disposed of at a licenced landfill as controlled waste. If berries and seeds are present, the plant should be bagged and sealed prior to removal to minimise the risk of seeds being spread off or across site during removal (Booly et al., 2008).

4.7.2 Chemical control

Smaller plants can be treated with herbicide however chemical uptake in larger plants is reduced. Larger plants should be stump treated after cutting to prevent regrowth.

4.8 Variegated Yellow Archangel

4.8.1 Removal

Variegated yellow archangel can be effectively removed manually by pulling providing that all root fragments are removed and remain intact. Care should be taken to ensure fragments are not left and monitoring of the area post removal should be monitored and repeated as necessary.

4.8.2 Disposal

Removed specimens should be disposed of off-site, transported as hazardous waste and taken to an appropriate waste facility.

4.9 Monitoring

After a period of one year to allow regrowth, yearly monitoring surveys should take place to ensure that Japanese knotweed has not breached through the root barrier membrane or is growing through the newly constructed defences, for a period of 3 years. A further survey should take place after 5 years. Where treatment of other invasive non-native species has taken place monitoring surveys should be taken yearly for a period of three years to ensure management has been effective. Treatment plans for all non-native invasive species are summarised in Table 2.

Table 2. Proposed treatment plan for invasive non-native species identified on site.

Species	Treatment type	Disposal type	Year 1	Year 2	Year 3+
Japanese knotweed	Full excavation (total lateral and vertical extent of rhizome within site)	Off-site in landfill, On-site sifted and buried On-site buried as cell burial	Full excavation	Monitoring of excavation area during growing season	Monitoring of excavation area during growing season

		On-site relocated for treatment			
	Reduced Level Excavation (remaining rhizome contaminated ground is capped with root barrier membrane)	On-site sifted and buried On-site buried as cell burial On-site relocated for treatment	Excavation and capping	Monitoring of capped area for regrowth	Monitoring of capped area for regrowth
	Herbicide treatment programme	In-situ	Herbicide treatment	Monitoring and reapplication of herbicide treatment	Monitoring and reapplication of herbicide treatment if applicable
Himalayan balsam	Hand pulling	On-site – composted Off-site - Controlled waste disposal	Hand pulling and composting	Monitoring of extent	Monitoring of extent
	Strimming to prevent regrowth (before flowering)	On-site - composted		Monitoring of extent	Monitoring of extent
Rhododendron	Cutting and pulling	On-site – chipped and composted Off-site - Controlled waste disposal		Monitoring of extent and cutting/pulling if required	Monitoring of extent and cutting/pulling if required
	Stump Treatment	In-situ	Herbicide treatment	Monitoring and reapplication of herbicide treatment	Monitoring and reapplication of herbicide treatment
Japanese rose	Cutting and excavation of stands	Off-site - Controlled		Monitoring of extent	Monitoring of extent

		waste disposal			
	Herbicide treatment programme	In-situ	Herbicide treatment	Monitoring and reapplication of herbicide treatment	Monitoring and reapplication of herbicide treatment if applicable
Cotoneaster	Cutting and excavation of stands	Off-site - Controlled waste disposal		Monitoring of extent	Monitoring of extent
	Herbicide treatment programme	In-situ	Stump treatment	Monitoring and reapplication of herbicide treatment	Monitoring and reapplication of herbicide treatment if applicable
Variegated Yellow Archangel	Pulling	Off-site - Controlled waste disposal	Monitoring and repeat pulling	Monitoring and repeat pulling	Monitoring and repeat pulling

5. References

Booly, O., Wade, P.M and White, V. (2008) Invasive species management for infrastructure managers and the construction industry. CIRCA C679, London.

Edwards, C., 2006. Managing and controlling invasive rhododendron. Forestry Commission.

Environment Agency (2013) the knotweed code of practice: Managing Japanese knotweed on development sites (version 3)

Figure 1. Site plan showing location of stands of non-native invasive species (IMNW000100-JAC-ZZ-4B0-DR-EN-1228)