STEPHENSON HALLIDAY

Planning, Landscape & Environment
an RSK company

RADCLIFFE MARKET

Invasive Weeds Management Plan

Vinci Construction UK Ltd

July 2022

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Document history

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1 EXECUTIVE SUMMARY

RSK have been commissioned by Vinci Construction to prepare an Invasive Weeds Management Plan to enable the redevelopment of Radcliffe Market. A 0.6Ha site in north Manchester on the bank of the River Irwell.

The aim of this management plan is to identify the extent of invasive weeds and provide a proposed methodology to avoid the accidental spread during the site development, proposing methods for control.

Forthcoming works will involve implementation of this management plan to ensure that control is implemented and biosecurity measures are adopted and adhered to in order to prevent accidental spread during development and repair works.

The survey was undertaken to focus on all invasive species registered on the Schedule 9 of the Wildlife and Countryside Act, 1981 or the Invasive Alien Species Order, 2019. Of those species, three were identified on site. These include Japanese Knotweed (*Reynoutria japonica*), Himalayan Balsam (*Impatiens glandulifera*) and Giant Hogweed. (*Heracleum mantegazzianum*).

This Invasive Weeds Management Plan has been informed by a desktop review of existing information and was followed up by a walkover survey of these areas to confirm extents. The combined approach identified a total of one large stand of Japanese Knotweed, seven pockets of Himalayan Balsam and a significant extent of Giant Hogweed dotted along the full extent of the site boundary.

The level of contamination however was less significant compared to that noted upstream and downstream of the site. The full width of the watercourse was also contaminated with invasive weeds noted on the other bank as well as islands in the middle of the watercourse.

The main constraints to achieving eradication are the presence of the watercourse, the recorded presence of nesting birds and land ownership. Having considered the options available to facilitate construction without causing additional spread, method statements for the initial operations and ongoing management have been made. As the contamination present is beyond the development boundary an approach to minimise ongoing spread from now through to the completion of construction is proposed by a control programme of herbicide applications and mechanical removal of the Himalayan Balsam.

A programme of herbicide treatment and mechanical removal, undertaken by competent contractors/operatives is required to limit the risk of accidental spread. This will include biosecurity measures put in place to ensure decontamination following operation within areas containing invasive weeds. This will reduce the risk of continued spread, return or encroachment of invasive species into neighbouring land, which is an offence under the Wildlife and Countryside Act, 1981.

If this program were continued over a period of years, it could achieve eradication. However, due to the levels of contamination upstream the likelihood of recontamination would be high and therefore ongoing control should be the obligation of the landowner.

2 INTRODUCTION

2.1 Purpose of Report

2.1.1 RSK have been commissioned by Vinci Construction to prepare an Invasive Weeds Management Plan to enable the redevelopment of Radcliffe Market. The proposed development plans used to inform this report are set out in Appendix 3 – Drawing No. RADHUB-PIE-00-00-DR-L-0001-P03- Landscape General Arrangement Plan.

2.1.2 The aim of this study is to identify the extent of invasive weeds and provide a proposed methodology to avoid the accidental spread during the site works and to propose methods for control.

2.1.3 The Management Plan provides guidance to ensure that appropriate management of invasive weeds is undertaken. Forthcoming works will involve implementation of this management plan to ensure that biosecurity measures are adopted and adhered to in order to prevent accidental spread during repair works, and that potential constraints to development are managed appropriately prior to the proposed commencement and during construction, reducing the risk of potential spread of contamination and implementing control with intentions to achieve eradication in due course.

2.2 Legislation

2.2.1 Japanese Knotweed is considered to be highly invasive and as such is listed in Schedule 9 of the Wildlife & Countryside Act 1981. A species is considered to be outwith its native range, if it has been imported to a location by human action, whether intentionally or otherwise. As such it is illegal to plant or otherwise knowingly cause these plants to grow in the wild or spread to adjacent land owned by others.

2.2.2 The Invasive Alien Species (Enforcement and Permitting) Order 2019 is also designed to prevent, minimise or mitigate the adverse impact of the introduction and spread of invasive species. This applies to Himalayan Balsam and Giant Hogweed which were formerly listed within Schedule 9 Part II of the W&CA 1981.

2.2.3 It is not an offence to have these plants on your land. However, it is considered best practice to responsibly manage all areas affected by non-native plants so to avoid their spread into the wild and to avoid detrimental impacts on biodiversity and the environment. Such management should be documented to demonstrate due diligence and show that all necessary steps have been taken to avoid allowing the non-native species to spread into the wild.

2.2.4 Non-native invasive plant material is considered a ‘controlled waste’ under the Environmental Protection Act 1990. Soil containing rhizome material can be regarded as contaminated and, if taken off a site must be treated as controlled waste and disposed of at a suitably licensed facility.

2.2.5 An infringement under the Environmental Protection Act can result in enforcement action being taken by the Environment Agency which can result in a fine. You can also be held liable for costs incurred from the spread of Japanese Knotweed into

adjacent properties and for the disposal of infested soil offsite which later leads to the spread of Japanese Knotweed onto another site.

2.2.6 As well as the legislation above, third party litigation for damages may be sought by adjacent landowners if non-native invasive weeds spread onto their land.

3 SITE INFORMATION AND SURVEY RESULTS

3.1 Data Review

3.1.1 A review has been undertaken of the:

- Landscape General Arrangement Plan, Drawing No. RADHUB-PIE-00-00-DR-L-0001-P03-0
- Radcliffe Market Preliminary Ecological Appraisal (PEA), November 2021, RSK Biocensus
- Breeding Bird and Nocturnal Bat Survey Letter Report, 2482901 – Rev0, July 2022, RSK Biocensus

3.1.2 Timescales for the delivery of development are expected to be progressed from March 2023 however riverside operations relating to development are not permitted to commence until June-August 2023 when water levels are lower and considered to be less risk.

3.1.3 Detailed development proposals were unavailable at the time of writing; however, it is understood that the intention is to build a balcony above the River Irwell on the existing Radcliffe Market building. It is intended that this will be accessed from a floating pontoon or via a cantilever scaffolding system to construct it. Other works that may require access this way include window infills and masonry repointing. During these operations installation of any systems to access into the riverbed is not deemed acceptable to the Environment Agency.

3.1.4 It is understood that no measures had been taken previously to remediate any invasive weed species present.

3.2 Landscape Context

3.2.1 The 0.6 ha site is located within the south of Radcliffe, North Manchester. The site includes a series of buildings including active and disused commercial and residential properties. Areas of hardstanding pavement surround the buildings, with scattered trees in hardstanding areas and planting beds situated within the north and south-east of the site.

3.2.2 The site is located within a predominantly commercial area. The River Irwell defines the eastern site boundary, while commercial units are located immediately north and south of the site. Dale Street is located west of the site, with further commercial buildings located beyond. An area of deciduous woodland is located along the banks of the River Irwell just to the south of the development site which provides separation from the commercial units present there.

3.3 Site Survey

3.3.1 A site survey was undertaken at Radcliffe Market, on 29th June 2022 by Matthew Gardner, a chartered member of the Landscape Institute (CMLI) at Stephenson Halliday experienced in the preparation of management plans for invasive weeds.

3.3.2 The approximate locations of invasive weeds identified during this study are illustrated on Drawing 001 Invasive Weed Location Plan in Appendix 1. Table 3.1 below indicates the nature and stand reference.

Table 3.1 Invasive Species Locations

ID	Species	Approximate Extent	Description/Location
GH1	*Heracleum mantegazzianum*	Minimum of 20 linear metres	On riverbank to the south of the site
GH2	*Heracleum mantegazzianum*	Single plant	Growth from the southern extent of the shingle beach.
GH3	*Heracleum mantegazzianum*	$3m^2$	Growth from the shingle beach. Three flower heads noted.
GH4	*Heracleum mantegazzianum*	$5m^2$	Growth from the shingle beach. Five stems growing in two clusters.
GH5	*Heracleum mantegazzianum*	Single plant	Growth from the shingle beach. Was not yet in flower at the time of the survey.
GH6	*Heracleum mantegazzianum*	Single plant	Growth from the shingle beach. Single stem in flower present but further plants in first year of growth also noted.
GH7	*Heracleum mantegazzianum*	$2m^2$	Two plants in flower and additional plants in the first year of their cycle growing on the shelf where proposed access is to be obtained.
HB1	*Impatiens glandulifera*	$1m^2$	Small cluster noted with no other surrounding vegetation but seemingly no substrate.
HB2	*Impatiens glandulifera*	Single stem	Single stem in flower noted. Assumed the shingle beach lies just below the water level here.
HB3	*Impatiens glandulifera*	$1m^2$	Small cluster noted. Assumed the shingle beach lies just below the water level here.
HB4	*Impatiens glandulifera*	$1m^2$	Small cluster noted growing within the shingle beach. Surrounded by giant hogweed individuals
HB5	*Impatiens glandulifera*	$2m^2$	Small cluster noted growing within the shingle beach. Surrounded by giant hogweed on one side and Japanese knotweed to the north.
HB6	*Impatiens glandulifera*	$1m^2$	Low growing cluster outcompeted by adjacent Japanese knotweed and giant hogweed.
HB7	*Impatiens glandulifera*	$3m^2$	Open stand against the Radcliffe Market wall (directly beneath sign) growing from shingle beach partly under water.

JK1	*Reynoutria japonica*	63m^2	Dense linear establishment along the base of the wall growing from the shingle beach. Occasional other invasive weeds growing within

3.3.3 Information regarding the invasive species identified is set out in the following sections. ID sheets and further information in relation to these species is available in Appendix 4. All are considered invasive weeds, the majority are listed on Schedule 9 of the Wildlife & Countryside Act 1981, Himalayan Balsam and giant hogweed are referenced under The Invasive Alien Species (Enforcement and Permitting) Order 2019.

3.4 Japanese Knotweed

3.4.1 Japanese Knotweed is a tall herbaceous perennial with bamboo like stems often growing into dense thickets. Last year's dead canes persist throughout winter. Japanese Knotweed spreads rapidly by rhizome spread and as a result of humans moving either fragments of rhizome or stem. Negative impacts include outcompeting native flora, but it can also cause significant delays and cost to development as well as structural damage.

3.4.2 Japanese Knotweed has been identified and recorded in one location extending along the boundary of the existing marketplace building growing on a shingle beach on the river margin. This is off site however it conflicts directly with the location of the proposed pontoon planned to be used to install scaffolding towers on to. In addition it cannot be confirmed whether rhizomes extend beneath the structure or are in cracks in the stonework. To date we understand that no herbicide has been applied these stands.

3.4.3 Japanese Knotweed is abundant both up and down stream where in localised areas it dominates all vegetation, even noted growing in an island in a shallow part of the river adjacent.

3.5 Giant Hogweed

3.5.1 Giant Hogweed is both an injurious plant as well as being invasive by outcompeting native flora, particularly along lowland rivers and on derelict land. Giant Hogweed is a biennial, forming a rosette of jagged, lobed leaves in the first year before sending up a flower spike in the second year and setting seed. It dies back in the winter leaving bare ground which may be susceptible to erosion.

3.5.2 It is typically 2-3 m high with thick, bristly, purple spotted stems. The flowers are white and held in umbels, with all the flowers in the umbel facing upwards and growing up to a size of 80cm in diameter.

3.5.3 The plant reproduces entirely by seeds dispersed by wind, water and humans. It only reproduces once in its lifetime but plants are able to self-fertilize and a single plant produces up to 20,000 seeds.

3.5.4 Chemicals found naturally within the plant can cause photodermatitis, where the skin becomes highly sensitive to sunlight and the skin may blister, undergo pigmentation, or have lasting scars from the contact.

3.5.5 Eleven Giant Hogweed plants were noted immediately adjacent to the Radcliffe Market site. These were those visible from the western bank, as a biennial plant it is assumed that there were additional plants in year 1 of their lifecycle that visibility of was obscured by the Japanese Knotweed.

3.5.6 Giant Hogweed is abundant both up and down stream along the western bank south of the proposed development site, also noted growing in an island in a shallow part of the river adjacent as well as on the eastern bank.

3.6 Himalayan Balsam

3.6.1 Himalayan Balsam is a shallow rooting annual plant which can grow grows up to 3m tall. A native of the Western Himalaya it grows rapidly, spreads easily, out-competes other vegetation and readily colonises new areas. When the plants die down in winter, they leave large bare areas that may be sensitive to erosion.

3.6.2 Himalayan Balsam has bright pink flowers from June to October and generates seedpods and seeds between July and October. The seedpods are dehiscent and explode when touched or shaken, with each plant producing up to 800 seeds being expelled up to 7m from the parent plant. These seeds germinate in the following spring to form a dense stand.

3.6.3 Himalayan Balsam is frequently found both up and down stream. Only six instances of plants were noted on site growing along the shingle beach, however this may be due to adjacent vegetation obscuring visibility.

3.7 Limitations and Risks

3.7.1 It was not possible to access the watercourse and therefore the boundary of the market building could not be accurately plotted. A visual survey was undertaken using the pitches of the roof as a rough guide to location which are shown in Appendix 1.

3.7.2 Due to the remote nature of the survey inspections could not determine presence of invasive weeds within existing vegetation. It is reasonable to assume that all areas of exposed shingle beach are contaminated with either the rhizomes of Japanese Knotweed or the seeds of Himalayan balsam or giant hogweed. It could not however be determined whether all contamination was growing from the shingle beach on the riverbed or whether there was potential that Japanese Knotweed rhizomes may have extended underneath or in to cracks in the building.

3.7.3 The contamination is not within the planning boundary of the site, therefore any recommendations to implement would need express permission of the landowner. The proposed pontoon would not be possible to float on the water surface due to the shallow depth, therefore if resting on areas of existing contamination or scaffolding poles are installed on to the riverbed or shingle beach, measures should be taken to decontaminate prior to leaving site.

3.7.4 Seeds of giant hogweed and Himalayan balsam are likely to disperse in late July and August. If seed dispersal is allowed to occur then the soil surrounding these plants can also be considered to be contaminated, but the full extents of any contamination cannot be confirmed.

3.7.5 It should also be noted that these invasive weeds are abundant upstream along the river Irwell. If eradication is to be achieved, then a joined up approach with all landowners affected would be required.

3.7.6 To minimise the risk of accidental spread happening in the future, all staff working on site at all stages of development should familiarise themselves with the identification of invasive weeds and report any suspected presence of new plants.

4 INVASIVE WEED MANAGEMENT OVERVIEW

4.1 Management Objectives

4.1.1 The objectives of this plan are to control existing invasive weed species on the land adjacent to the development site, preventing further spread during any construction activity.

4.1.2 Longer term, best practice recommendations and guidance for achieving eradication in relation to the invasive weeds outside of the development site, but still within the ownership boundary are also included.

4.2 Control Options

Giant Hogweed

4.2.1 Due to the toxic nature of giant hogweed, all management should be undertaken by suitably experienced contractors with appropriate PPE. Seeds can remain viable in the soil for several years so eradication relies on the depletion of the seed bank. The details are summarised below in Table 4.1.

Table 4.1: Giant Hogweed Treatment Options

Treatment Method	Methodology	Advantages	Disadvantages
Herbicide	Treatment of the affected areas in-situ with a variety of herbicides via spraying or stem injection, achieving control over a number of years.	Cost effective solution. Undertaken in-situ with other works without risk of spreading. Injection will reduce seed viability if already in production.	Drawn out process that will take at least a couple of years as it does not kill the existing seedbank. Must remain undisturbed. Restricted use of chemicals near existing vegetation and waterways.
Mechanical Cutting	Mechanical removal and disposal of the flower head prior to seeding. Will obtain control over the course of the biennial life cycle.	Cost effective solution. Undertaken in-situ with other works without risk of spreading.	Drawn out process that will take at least a couple of years as it does not kill the existing seedbank. Risk of injury if exposed to the sap. Flower head requires disposal as controlled waste or incineration on site.
Removal to Landfill	Excavate Giant Hogweed and soil surrounding up to 4m and remove to certified land fill in haulage vehicles.	No restrictions left on site. Work can continue after removal.	Expensive Requires supervision by suitably qualified invasive weeds manager/contractor. Risk of spreading during transport.

			Least sustainable approach due to requirement for landfill.

Himalayan Balsam

4.2.2 Due to previous flowering and seed dispersal, eradication may take a number of years. It is key to undertake management works prior to Himalayan Balsam setting seed, and to reduce the seed bank in the soil gradually through an extended period of management. Initial control should be implemented prior to flowering, seedlings may generate in the space left by control/removal of the main plant, therefore follow up visits are likely to be required.

4.2.3 Options for the control of Himalayan balsam are dependent on a range of factors but timing of operations is key. It may take a couple of seasons to obtain good control of Himalayan Balsam, as additional weed seedlings will germinate after the parent plants are killed off. The options are chemical or mechanical control, these are summarised below in Table 4.2, but in all instances, control should be undertaken prior to seeding and multiple visits may be required in each growing season.

Table 4.2: Himalayan Balsam Treatment Options

Treatment Method	Methodology	Advantages	Disadvantages
Herbicide via foliar spray	Treatment of the affected areas in-situ with a variety of herbicides via spraying.	No requirement for removal of waste from site.	Restricted use of chemicals near existing vegetation and waterways. Lack of selection of underlying species. May be a drawn out process as it does not kill the existing seedbank. Plants may still seed if seed pod development has begun.
Hand pulling	Treatment of the affected areas in-situ with a variety of herbicides via stem injection.	Most ecologically sensitive approach. Focussed application minimising impact on other vegetation. If undertaken prior to seeding prevents dispersal.	May be a drawn out process. Arisings require disposal on site or offsite as controlled waste.
Cutting	Manually cut to above ground level.	Prevents dispersal if undertaken prior to seeding. Less labour intensive than hand pulling.	Lack of selection of underlying species. May be a drawn out process. Arisings require disposal onsite or offsite as controlled waste.
Removal to Landfill	Excavate Himalayan Balsam and soil surrounding up to 6m and remove to	No restrictions left on site.	Expensive

	certified land fill in haulage vehicles.	Work can continue after removal.	Requires supervision by suitably qualified invasive weeds manager/contractor. Risk of spreading during transport. Least sustainable approach due to requirement for landfill.

Japanese Knotweed

4.2.4 There are several options for Japanese Knotweed control on development sites. These are by chemical control, mechanical control or a combination of both, the main options are summarised below in Table 4.3.

Table 4.3: Japanese Knotweed Treatment Options

Treatment Method	Methodology	Advantages	Disadvantages
Herbicide	Treatment of the affected areas in-situ with a variety of herbicides via spraying or stem injection, achieving control over a number of years.	Most cost effective solution. Undertaken in-situ with other works without risk of spreading.	Long, drawn out process (minimum. 3yrs). Must remain undisturbed. Restricted use of chemicals near existing vegetation and waterways.
Stock Piling	Excavate Knotweed stand and moving material to an area not affected by development where it can be treated with chemicals.	Cost effective. Allows treatment to be undertaken in situ with development works.	Requires undisturbed area of sufficient size to allow control. Excavated material must remain on site. Restrictions remain in stockpiled area until eradication verified, so long process. Risk of spreading on site.
Screening	Excavating material and screening through a 25mm gauge mesh to remove larger fragments which are incinerated. Re-growth from other fragments is then treated with chemicals as above or disposed of as contaminated waste.	Cost effective. Allows treatment to be undertaken in situ with development works. Less time consuming than herbicide applications to fully established stand.	Requires incineration or removal and disposal offsite. Does not rapidly eliminate the plant, only reduces infestation. Requires set-a-side area on site for contaminated soil. Risk of spreading on site.
Burial	Excavating the Japanese Knotweed and surrounding material and burying	No set-a-side area required.	Restrictions remain on site.

	on site to a minimum of 5m below the surface and capping with a root barrier membrane.	Works can commence immediately after burial.	Limitations of use of the land above the burial area. Requires a large hole to receive material. Costly excavating plant required. Risk of spreading on site.
Removal to Landfill	Excavate Japanese Knotweed and remove to certified land fill in haulage vehicles.	No restrictions left on site. Work can continue after removal.	Expensive Requires supervision by suitably qualified invasive weeds manager/contractor. Risk of spreading during transport. Least sustainable approach due to requirement for landfill.

4.2.5 In many instances for all of these invasive weeds, complete eradication can take several years. Rhizomes or seeds can remain viable, persisting in the soil for many years. The choice of treatment option is affected by the following:

- Location and site condition.
- nature of development and timeframe.
- size of affected area.
- site access.
- services.
- presence of other vegetation.
- presence of protected species.
- location of watercourses.
- cost.
- use of area after treatment.

4.3 Recommended Options

4.3.1 Sited in the water course of the River Irwell, the land containing invasive weeds that affects construction is outside of developer ownership, there are also potential complications relating to consent from the Environment Agency.

4.3.2 Even if excavation operations did not have the potential to impact on hydrology it is not deemed practicable nor sustainable to eradicate via excavation. This is primarily due to access difficulties and potential restrictions with the necessary plant, but also due to the nature of the contamination. Therefore efforts will be made to achieve

control in situ in order to prevent the risk of accidental spread during development works and minimising direct disposal to landfill.

4.3.3 Due to the expected timeframe of delivery of the completed development in 2023, it will not be possible to achieve complete eradication of all invasive weeds. This is reinforced by the ongoing potential for recontamination by seed and vegetative transferral from upstream. Therefore initial control operations should commence at the earliest opportunity to reduce the level of contamination for when construction starts. This should be continued in the new growing season up until construction commences to minimise the risk of accidental spread or potential harm caused by giant hogweed to any site staff.

4.3.4 Prior to construction, further control in the new growing season should be undertaken to ensure there is no visible presence of any invasive weed species when operations do commence. Timing is therefore critical and should be undertaken 2-3 weeks prior to a confirmed start date. Further inspection is also advised in the few days before to confirm success.

4.3.5 However, unavoidably contamination will remain within the riverbed and on the shingle beach. This necessitates appropriate work methodologies and biosecurity measures to be put in to place to enable works to be progressed without causing inadvertent spread of invasive weeds.

4.4 Control Options Constraints

4.4.1 It will not be feasible to achieve eradication of the various invasive weed species prior to the commencement of the construction works using only chemical control or management operations. Therefore, all options set out in the preceding sections have been considered for each individual occurrence in relation to existing site conditions and proposed timescales.

Underground Utilities

4.4.2 The presence or absence of underground utilities should only need to be established in instances where excavation is being considered as a control option.

Proximity to a Watercourse

4.4.3 The River Irwell presents a considerable constraint to many control options. Japanese knotweed, giant hogweed and Himalayan Balsam are present on the banks of a water body. A glyphosate-based herbicide should only be used for treatment adjacent to a watercourse. If adopted as the appropriate control measure, then any such treatment will require prior consent from the Environment Agency via means of the submission of a AqHerb01 application (Agreement to use herbicides in or near water). Certification demonstrating the competency of the operative who will carry out the treatment will need to be provided to the EA.

Protected Species

4.4.4 Other potential constraints include the presence of protected species. The PEA suggests minimal potential for protected species. Detailed surveys have discounted

potential for bat roosts but noted potential presence of breeding birds within the working area.

Nesting Birds

4.4.5 At the time of survey birds, potentially sand martins were noted entering and exiting a hole in the wall of Radcliffe Market. This does not present a constraint to control however any works to repoint this façade should be considerate of nesting birds season. Ecological advice should be sought.

4.4.6 In order to gain access to manage the invasive weeds or to construct the pontoon, if any scrub, hedge or tree removal is considered to be required during the bird nesting season (March – August inclusive), a further inspection for nesting birds should be carried out within 48 hrs beforehand. Should any nesting birds be encountered, works should be ceased and rescheduled. Ideally, such vegetation works that could affect nesting birds should be carried out in winter outside of the bird nesting season, but if required to be cleared during the nesting season the site should be checked by an ecologist, and any nests in use must be avoided or left undisturbed until the young have fledged.

4.4.7 A pair of bullfinches (*Pyrrhula pyrrhula*) were recorded nesting in the stand of Japanese knotweed at the base of the river wall, adjacent to Radcliffe Marketplace. The location is shown in Appendix 1, with a 10m buffer also marked on to ensure clearance of vegetation is not undertaken until the young have fledged after the breeding season ends – beginning of September.

Existing Trees

4.4.8 Legal considerations apply only to those trees under the TPO which does not apply to this site. However, general consideration should also be given to the amenity value that all trees on site provide. If it is intended for particular trees to be retained, similar protections should be afforded to them. If proposed excavations are likely to adversely impact the Root Protection Area (RPA) of trees to be retained, advice should be sought from an arborist to determine the extent which this may be deemed suitable. If to the detriment of the tree then alternate considerations may be required in relation proposed control.

4.4.9 If herbicide applications are being undertaken, due care and attention should be given to ensure avoidance of potential damage to adjacent trees during herbicide applications, undertaking works on a suitably calm day if a foliar application of herbicide is deemed necessary.

5 MANAGEMENT

5.1 Roles & Responsibilities

5.1.1 All personnel on site shall receive details regarding the identification of Invasive Weeds (Appendix 4) and on the prevention of further spread as detailed in 4.2.1. This is to ensure staff are able to recognise the plant and know how to report it accordingly.

5.1.2 Roles and responsibilities for the management of the Invasive weeds are detailed below in table 5.1.

Table 5.1: Party Roles and Responsibilities

Name and Job Title	Company	Roles and Responsibilities
Client	Vinci Construction UK Ltd	Ensure that Invasive Weed control is implemented to prevent further spread into adjacent land and achieve eventual eradication.
Main Contractor	Vinci Construction	Overall responsibility for construction of development scheme, managing and reporting presence of invasive weed species. Ensure all works in adherence with best practice to ensure biosecurity measures are adopted. Ensure all site personnel are aware of all invasive weeds and adequately briefed.
Specialist Contractor	ATV Contract Services	To be appointed to undertake proposed remediation where any excavation works, herbicide applications or supervision of other operations are required in controlled areas is required. Adherence to the management plan, provision of risk assessments.
Environmental Consultant	Stephenson Halliday	Development of the Invasive Weeds Management Plan.

5.2 Communication

5.2.1 Prior to commencement of any works, all staff are to receive a toolbox talk highlighting the environmental risks associated with working in close proximity to invasive weeds.

5.2.2 All staff working on site during construction and in ongoing maintenance should familiarise themselves with the identification of all invasive species. They should remain vigilant and notify the Site Manager if they suspect new stands of any invasive weeds are present.

5.2.3 Photographs showing the main characteristics of the plant must be displayed in communal areas during the duration of works as a reminder to all personnel on site.

5.2.4 If any new areas of infestation of any invasive species are found in the surrounding areas, access should cease until an isolation zone is created. Amendments to this Invasive Weed Management Plan should be made following discovery of any further stands of all invasive weed species.

5.2.5 The presence of invasive weed species on adjacent land should be highlighted to landowners, reminding them of their responsibilities to control spread in line with the legislation reference in section 1.1. This will aid to minimise the adverse impact on the environment by reducing colonisation but also prevent spread back into the proposed development site. This is of particular relevance to the landowners to the north where contamination would appear to be spreading downstream from, however it is acknowledged that this is a much wider ranging issue requiring an integrated management approach from all landowners in order to control invasive weeds in the River Irwell catchment and is not achievable within the scope of the Radcliffe Market development.

6 MANAGEMENT METHODOLOGY

6.1 Initial Control

6.1.1 Due to issues with the location of the contaminated land being within a watercourse and belonging to others there is no solution that could achieve eradication prior to the commencement of development.

6.1.2 Immediate action should be taken to prevent further spread of known contamination into surrounding areas and to reduce the level of infestation prior to works to reduce the risk of potential spread during operations.

6.1.3 Due to time constraints, initial control measures for Himalayan balsam and giant hogweed have been prioritised in order to try and reduce potential contamination in the following year. However, initial herbicide applications to Japanese knotweed may also be beneficial to assist in reducing accidental spread during construction.

Giant Hogweed

6.1.4 Giant Hogweed is currently in flower, therefore the flower heads should be removed before seeds begin to form and be dispersed. The removed flowerheads will require disposal as controlled waste as there is no potential to incinerate on site.

6.1.5 An initial herbicide application to both the established plants and those in the first year of their biennial cycle is also advised. Herbicide application should be undertaken by means of stem injection.

6.1.6 Herbicide applications should be carried out by suitably competent contractors (NPTC PA1, PA6, PA6AW) using glyphosate based herbicides, as well as the relevant award relating to the equipment being used (NPTC PA6INJ). An application to the EA to use herbicides in proximity to watercourses will be required via AqHerb01 form. Full PPE and protective clothing and a mask must be used at all times when handling herbicides and working with giant hogweed.

6.1.7 Operatives undertaking this work should ensure they wash down footwear prior to leaving contaminated area.

Himalayan Balsam

6.1.8 An initial control via hand pulling prior to the remaining Himalayan Balsam plants seeding is recommended. This operation should be undertaken initial at the same time as the removal of flower heads of the giant hogweed and be disposed of as controlled waste as there is no potential to incinerate on site.

6.1.9 When contractors return to undertake the herbicide application to the giant hogweed and Japanese knotweed a further inspection and hand pull of new growth should also be undertaken.

6.1.10 Operatives undertaking this work should ensure they wash down footwear prior to leaving the contaminated area.

Japanese Knotweed

6.1.11 Japanese Knotweed remains actively growing and therefore an initial herbicide application could still be carried out in appropriate climatic conditions. This will not remove existing contamination but will ensure that control is commenced at the earliest opportunity therefore achieving control within a shorter timeframe.

6.1.12 The preferred method of the initial herbicide application is stem injection to contain herbicide application and avoid discharge into the adjacent watercourse. This approach should be applied to stems of a suitable diameter but only glyphosate based herbicides should be used and all operatives carrying out stem injection works must hold a valid certificate of competence (NPTC PA1, PA6, PA6AW) as well as the relevant award relating to the equipment being used (NPTC PA6INJ).

6.1.13 An application to the EA to use herbicides in proximity to watercourses will be required via AqHerb01 form. This application should be undertaken at the earliest opportunity as soon as consent is received.

6.1.14 Full PPE and protective clothing and a mask must be used at all times when handling herbicides.

6.1.15 Operatives undertaking this work should ensure they wash down footwear prior to leaving contaminated area.

6.2 Prevention of Spread

6.2.1 If any access is required in an authorised capacity, operatives undertaking this work should ensure they wash down footwear prior to leaving a contaminated area.

6.3 Ongoing Management

Giant Hogweed – GH1-7

6.3.1 The health and safety risks of exposure to giant hogweed should be effectively mitigated by the use of coveralls, gloves and eye protection and should be demonstrated in contractor RAMS.

6.3.2 In 2023 an application of glyphosate based herbicide should be undertaken to all giant hogweed specimens prior to commencement of construction operations. Advance notification should be given to the specialist contractors to ensure they are able to attend site 2-3 weeks in advance of commencement to undertake this. Application should be via means of stem injection. However, if any growth is too small then spraying should be undertaken using a knapsack sprayer, avoiding spray drift and minimising impact on the watercourse. All leaves are to be thoroughly sprayed until the point of “run-off”, using the manufacturers recommended concentrations on still, cool, dry days to minimise spray drift. Rainfall soon after application may wash the herbicide off the leaves and reapplication would be necessary. Full PPE and protective clothing and a mask must be used at all times when handling herbicides.

6.3.3 Herbicide applications should be carried out by suitably competent contractors (NPTC PA1, PA6, PA6AW) using glyphosate based herbicides, as well as the relevant award relating to the equipment being used (NPTC PA6INJ).

6.3.4 If any plants which reach maturity and begin to flower in June-July should have the heads cut off. Giant hogweed dies after flowering so this will prevent reproduction and seed dispersal. These flower heads should be considered controlled waste and disposed of offsite to an authorised landfill.

Himalayan Balsam – HB1 - 7

6.3.5 Where Himalayan Balsam has been recorded, ongoing monitoring for presence should be undertaken and where present a program of hand pulling individual specimens should commence in July prior to plants seeding.

6.3.6 The spaces created by hand pulling will leave exposed ground for smaller seedlings to grow, therefore the area should be revisited during the growing season in September to remove these as Himalayan Balsam can continue to grow and spread viable seed into October.

6.3.7 Arisings will require disposal as controlled waste as there is no potential to incinerate on site.

6.3.8 When contractors return to undertake the herbicide application to the giant hogweed and Japanese knotweed prior to commencement of works in 2023 a further inspection and herbicide of any new growth should also be undertaken. However, if operations are delayed and seed pods have begun to form then hand pulling and disposal offsite will be required.

Japanese Knotweed – JK1

6.3.9 An initial application of herbicide should be undertaken to all stands of Japanese Knotweed on site when adequate leaf coverage is established to enable translocation of the herbicide into the rhizome system.

6.3.10 In September 2022 and again in 2023 an application of glyphosate based herbicide should be undertaken to all Japanese knotweed stems prior to commencement of operations. Advance notification should be given to the specialist contractors to ensure they are able to attend site 2-3 weeks in advance of commencement to undertake this in conjunction with the control to the giant hogweed detailed in 6.3.2. Application should be via means of stem injection, however if any growth is too small then spraying should be undertaken using a knapsack sprayer to avoid drift and minimising impact on the watercourse. All leaves are to be thoroughly sprayed until the point of “run-off”, using the manufacturers recommended concentrations on still, cool, dry days to minimise spray drift. Rainfall soon after application may wash the herbicide off the leaves and reapplication would be necessary. Full PPE and protective clothing and a mask must be used at all times when handling herbicides.

6.3.11 In all instance’s herbicide applications should be carried out by suitably competent contractors (NPTC PA1). Only glyphosate based herbicides must be used and the additional PA6AW qualification should be insisted upon and operatives must hold a valid certificate of competence as well as the relevant award relating to the equipment being used (NPTC PA6INJ).

6.3.12 The herbicide options are summarised in table 6.1.

Table 6.1: Suitable Herbicide options

Herbicide	Time of Application	Comments	Acceptable to Use
Glyphosate	May - October	Non-persistent in the soil and certain brands suitable for works near to watercourses	✓
2,4-D Amine	May - October	Persistent in the soil for up to 1 month	×
Aminopyralid (Often combined with Triclopyr)	May - October	Persistent in the soil for up to 6 weeks. Generally not suitable for use via stem injection.	×

6.3.13 Table 6.2 below highlights an approximate schedule for the most appropriate timing of herbicide management for treatment of all three invasives weeds up to and including the intended construction program.

Table 6.2: Proposed timetable for herbicide control

Date	Action
July 2022	Remove flower heads from Giant Hogweed. Hand pull Himalayan Balsam
August 2022	Herbicide application via stem injection to all giant hogweed and Japanese knotweed outside the nesting bird buffer.
September 2022	Herbicide application via stem injection to all giant hogweed and Japanese knotweed inside the nesting bird buffer, along with any new growth noted or stems where previous application had not been effective. Himalayan Balsam new stems evident to be pulled and disposed of.
May-June 2023	Herbicide application via stem injection to all giant hogweed and Japanese knotweed outside the nesting bird buffer, or via foliar application if plant stature is not appropriate. Herbicide application to Himalayan balsam.
June-August 2023 (Dependant on construction program)	Inspect site to monitor return of invasive species present and control with herbicide as appropriate.

6.4 Biosecurity Measures

6.4.1 Even after invasive weed control has commenced, accidental spread remains possible.

6.4.2 All of the invasive species present on site regenerate from viable fragments or seed, therefore access without appropriate biosecurity precautionary methodology and supervision is not considered appropriate.

6.4.3 As such the most effective solution to preventing spread of invasive weeds is for construction works and pedestrian traffic to avoid identified areas wherever possible.

6.4.4 Should access be required prior to eradication being confirmed measures in line with 6.4.5 should be adhered to. Where pedestrian access is required to these areas, biosecurity measures should be put in place to prevent any accidental spread.

6.4.5 Areas of all invasive weeds should be considered as 'contaminated'. It is important to ensure that all mud that may contain fragments of plant or seed is removed from all equipment prior to exiting the infested areas and entering other uncontaminated areas, as such the following measures put in place as required when areas containing invasive weeds are accessed:

- All equipment to be washed down prior to leaving infested area.
- All personnel to wash down footwear prior to leaving infested area.
- All materials or equipment used to create access to construct the balcony should be washed down prior to leaving the infested areas.
- The above wash downs should be done over polythene or similar upon exiting areas of invasive weeds and washed down with a brush to prevent seeds and fragments of plants being picked up; and
- Polythene should be checked for spilled material, which must be removed as controlled waste or left within contaminated areas.

6.5 Long Term Management

6.5.1 Best environmental practice for ongoing control of giant hogweed, Himalayan balsam and Japanese knotweed along the River Irwell adjacent to the Radcliffe Marketplace would suggest an ongoing herbicide control plan.

6.5.2 This is not considered viable due to the levels of contamination upstream as recontamination would be an ongoing issue. The contamination within the watercourse is outside of developer ownership and would therefore be considered the responsibility of the landowner.

7 REFERENCES

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Child, L.E. and Wade, P.M. (2000) *The Japanese Knotweed Manual*, Packard Publishing Limited, Chichester.

Environment Agency (Version 3, Amended 2013), *Managing Japanese Knotweed on Development Sites: the Knotweed Code of Practice* – Document has now been withdrawn

GB Non Native Species Secretariat Identification Sheets

APPENDIX 1: INVASIVE WEEDS LOCATION PLAN

0308-invasive-weeds.qgz

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STEPHENSON HALLIDAY
Planning, Landscape & Environment
an RSK company

Radcliffe Market Hall - 0308

FIGURE NUMBER 001

Radcliffe Market Hall - Invasive Weeds Location Plan

KEY

Boundary Line

- Boundary
- HB = Himalayan Balsam 1-7 Plants
- GH = Giant Hogweed 1-10 Plants
- JK1 - Japanese Knotweed
- JK1 7m Buffer Zone
- Bullfinch (Pyrrhula pyrrhula) Nest
- 10m NO WORKS nest buffer

Projected Coordinate System: British National Grid

DATE	BY	PAPER	SCALE	QA	REV
JUL 2022	EK	A3	1:500	MG	000

APPENDIX 2: SITE PHOTOS

STEPHENSON HALLIDAY
Planning, Landscape & Environment

Site:	Radcliffe Market, River Irwell

Photo 1: River Irwell. Invasive weeds along the wall of the market

Photo 2: Individual giant hogweed plants (GH1-2) and small infestations of Himalayan balsam (HB1-4) at south end of the market wall.

Photo 3: Giant hogweed (GH3-4) and the southern end of the Japanese knotweed (JK1) growing in the shingle beach. Himalayan balsam also present.

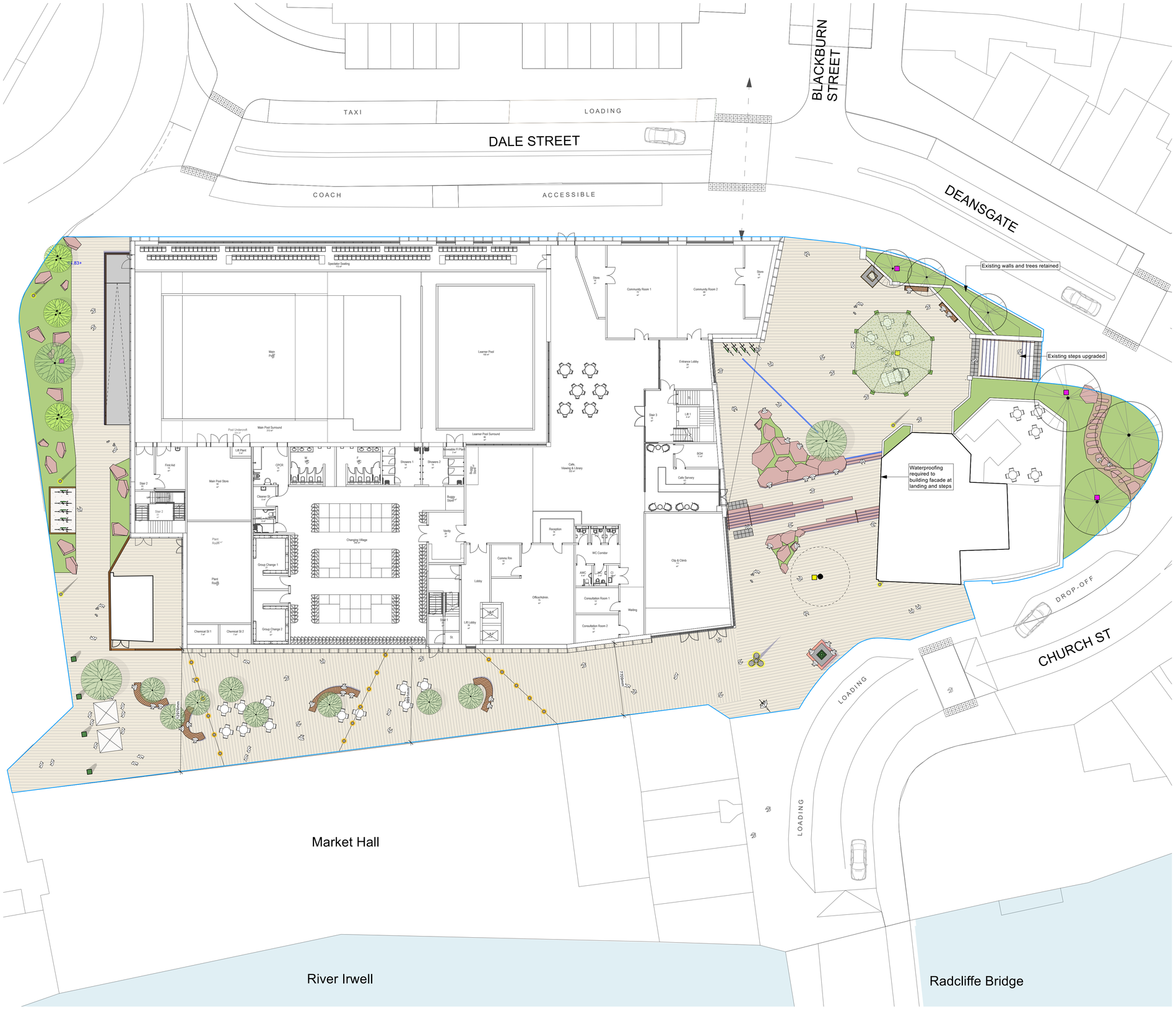
Photo 4: Giant hogweed (GH5-6), the northern end of the Japanese knotweed (JK1). Himalayan balsam (HB6-7) also present.

Photo 5: Himalayan Balsam (HB7) dominates a small section of shingle beach. Giant Hogweed (GH 5-6) also present.

Photo 6: Giant Hogweed (GH7) growing on the shelf above the reviverbed where access point is proposed.

APPENDIX 3: LANDSCAPE PLAN

Drawing No. RADHUB-PIE-00-00-DR-L-0001-P03-0



MEMORIAL TO ARENA ATTACK
- Relocatted within Piazza/Bridge Square

TIMBER SEATING
- With arm and back rests

EXISTING BANDSTAND RETAINED
- Improvement works to be agreed
- Sedum roof incorporated

HANDRAILS TO STEPS

BALUSTRADE TO RAMP

CHRISTMAS TREE INGROUND HOUSING
- Circular socket and sleeve
- To include above ground power socket and supply

EXISTING RADCLIFFE CLOCK
- Relocated and raised with new stone seating plinth to perimeter

CYCLE STANDS

CYCLE SHELTER

EXISTING TIMBER SEATING RETAINED
- Relocated, separated and improved

BOLLARDS
- Removable bollards

BIRD & BAT BOXES
- Exact location and specification TBC with ecologist

MUTLI-HEADED LIGHTING COLUMN
- Located in key event spaces

LIGHTING COLUMN
- To adoptable standards

OVERHEAD CATENARY LIGHTING

POP-UP POWER PROVISION
- For events
- Location TBC

EXISTING TREE RETAINED

SEMI-MATURE TREE
- Container grown
- See softworks drawing for more information

MULTI-STEM TREE
- Container grown
- 3.5m high

ORNAMENTAL PLANTING
- Ornamental planting with 50% evergreen
- 5L pots at 7m2
- Herbaceous, grasses and evergreen species
- 450mm topsoil
- 50mm bark mulch to top

THIS DRAWING IS COPYRIGHT PROTECTED AND MAY NOT BE REPRODUCED IN WHOLE OR PART WITHOUT WRITTEN AUTHORITY FROM THE OWNER.

NOTES:
1. Do not scale from this drawing.
2. Always work to noted dimensions.
3. All dimensions are in millimetres unless otherwise stated.
4. All setting out, levels and dimensions to be agreed on site.
5. The dimensions of all materials must be checked on site before being laid out.
6. This drawing must be read with the relevant specification clauses and detail drawings.
7. Order of construction and setting out to be agreed on site.

KEY:

Line of design responsibility
- Demarcated with in ground fisuh studs

+65.66 **SPOT LEVEL - Existing**
Levels as per Topographic Survey

+65.66 **SPOT LEVEL - Proposed**

1:26 **FALLS - Proposed**

P01 **CONCRETE AGGREGATE PAVING**
Location: Site wide
Material: Kellen - Breccia/Lisico or equal and approved
Manufacturer: Hardscape Ltd or equal and approved
Colour: Mid grey tones TBC
Size: W150mm x L 300mm x D TBC by engineer
Bond: TBC
Finish: TBC
Other: Demarcation studs between public highway and Radcliffe Hub public realm. To include bespoke end units

P02 **HAZARD WARNING PAVING - STEPS/RAMPS**
Location: To top and bottom of steps in public realm
Material: Concrete tactile units
Manufacturer: Marshalls or equal and approved
Colour: Contrasting tone to adjacent paving
Size: 400mm L x 400mm W x 50mm D (depth tbc by engineer)
Bond: Stack bond

P03 **SANDSTONE CUT BOULDERS**
Location: Site wide
Material: Red sandstone with artwork opportunity integrated TBC
Manufacturer: CED or equal and approve
Colour: Natural
Size: 1000mm max length, 600mm max height
Other: To be devoid of sharp corners and be comfortable to the touch

P04 **SANDSTONE PATH**
Location: East of the Bridge Tavern
Material: Red sandstone stepping stones
Manufacturer: CED or equal and approve
Colour: Natural
Size: 1000mm max length and width x TBC depth
Other: To be flush in bark mulch path

P05 **SANDSTONE STEPS**
Location: Site wide
Material: Red sandstone with artwork opportunity
Colour: Natural
Size: W Various x L 915 x D Various

P06 **RAMP TO HUB BUILDING**
Insitu cast concrete wall, tapering with ramp. Steel flat bar vertical railing fixed to top. Brushed concrete surfacings

P07 **CLADDING TO SUBSTATION**
Subject to further design detail with architect

Revision	Date	Description	Drawn	Apprvd.
S2-P03	10-05-2022	STAGE 03	JTO	RM
S2-P02	25-01-2022	STAGE 02	JTO	RM
S2-P01	20-01-2022	STAGE 02	JTO	RM

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Client: Bury Council

Project: Radcliffe Civic Hub

Drg Title: Landscape General Arrangement

Created on	Created by	Approved by
04-01-2022	JTO	RM

Scale	Size	Workstage
1:200	A1	Stage 03

Drg No.	Suitability	Revision
RADHUB-PIE-00-00-DR-L-0001	S2	P03

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APPENDIX 4: INVASIVE WEEDS IDENTIFICATION SHEETS

NNSS – GB Non-Native Species Secretariat

Giant hogweed

Himalayan balsam

Japanese knotweed

NNSS
GB non-native species secretariat

www.nonnativespecies.org

Produced by Olaf Booy, Max Wade and Vicky White of RPS

Giant Hogweed

Species Description

Scientific name: *Heracleum mantegazzianum*
AKA: Efwr enfawr (Welsh)
Native to: Caucasus mountains in south west Russia and Georgia
Habitat: Widespread, most common on river banks

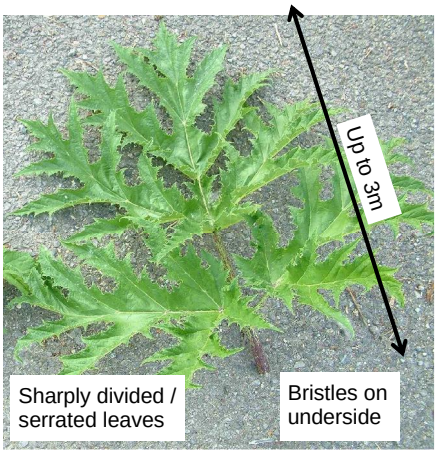
Easy to identify when fully grown by height, size of leaves and size of flowers. Can be confused with native hogweed when not fully grown or when growth is stunted (e.g. regrowth after cutting).

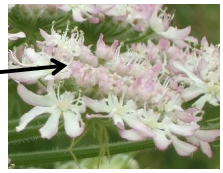
Introduced as an ornamental. First recorded wild in the UK in the late 19th century. Spreads solely by seeds, mainly through deliberate planting, wind dispersal and in water courses. Now common across much of the UK. Contact with any part of this plant must be avoided as even minute amounts of sap can cause blistering of the skin following exposure to sunlight. Other negative impacts include out-competing native flora, river bank erosion and increase in flood risk. Can cause delays/ additional costs on development sites where the plant must be removed as controlled waste in order to comply with legislation.

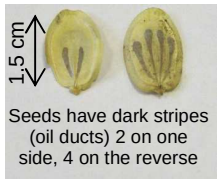
Giant hogweed is listed under Schedule 9 to the Wildlife and Countryside Act 1981 with respect to England, Wales and Scotland. As such it is an offence to plant or otherwise cause this species to grow in the wild. Under the Environmental Protection Act 1990, giant hogweed is also classified as controlled waste.

For details of legislation go to www.nonnativespecies.org/legislation.

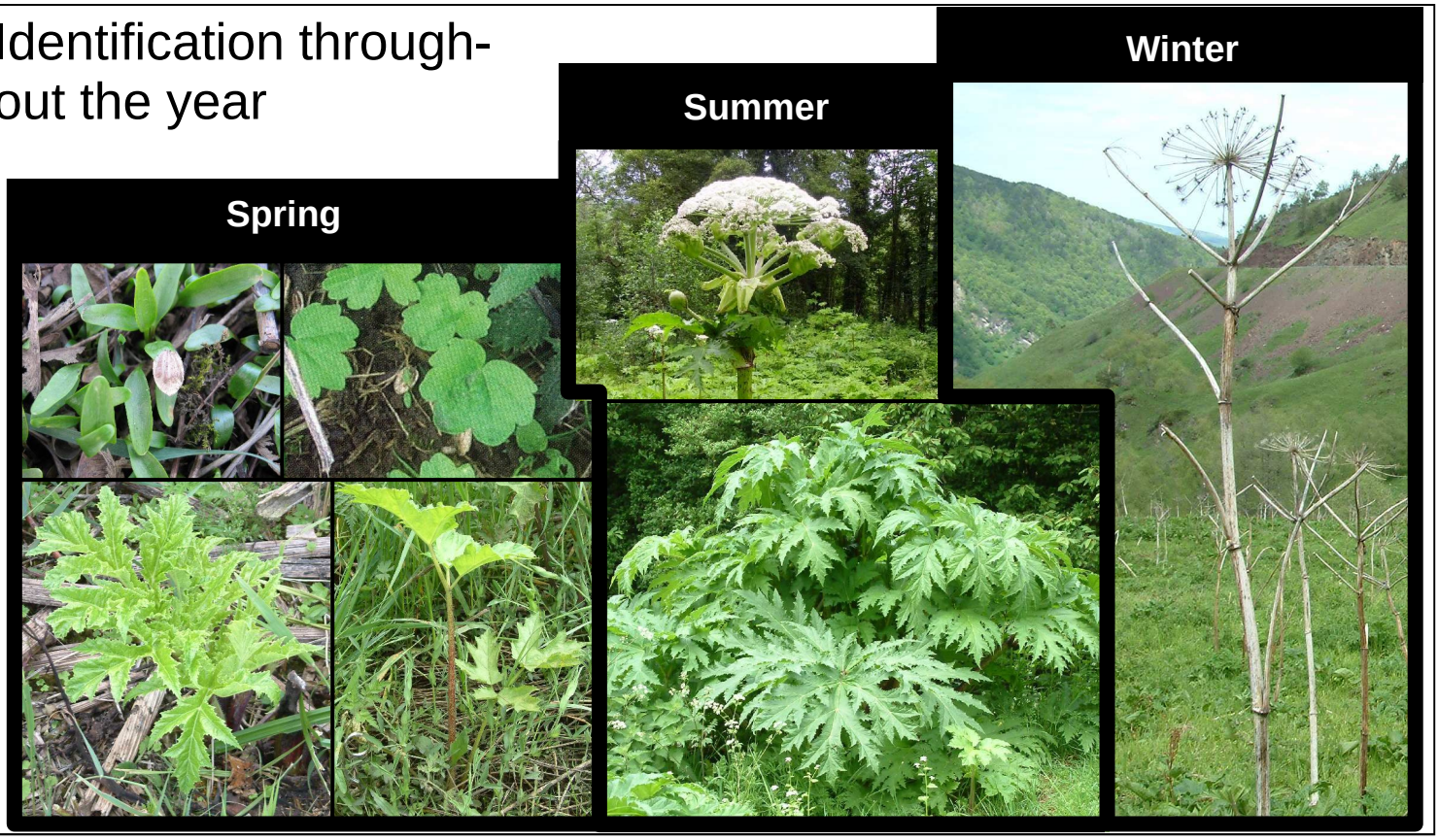
Key ID Features







Identification throughout the year

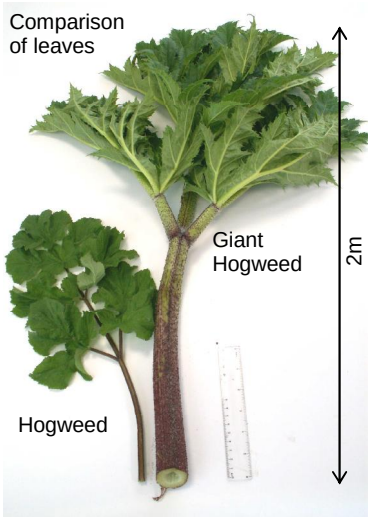


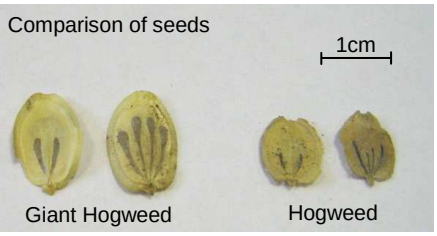
Similar Species

When in full height it is difficult to confuse giant hogweed with any other plant. While still growing or stunted, possibly as a result of disturbance, it can be confused with some other native plants. The most likely species with which it might confused is hogweed.

Key differences between hogweed and giant hogweed include the height, width of stem, size of leaf, size of flower head and size of seed.

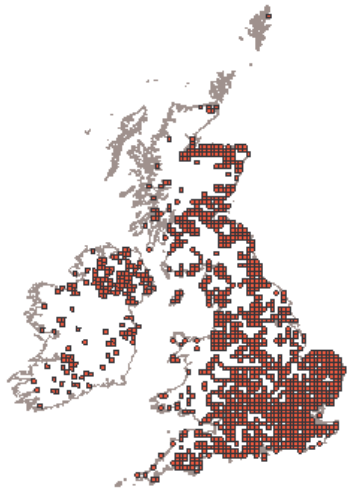
Hogweed
Native
(*Heracleum sphondylium*)





Distribution

Widespread and common across much of the UK. Extensive infestations are found particularly in Scotland and the north of England. Less abundant in Cornwall. Often associated with large rivers.



Source: NBN Gateway. Check website for current distribution

References and further reading:

Blamey, M, Fitter, R and Fitter, A (2003) *"The Wild Flowers of Britain and Ireland. The Complete Guide to the British and Irish Flora."* A & C Black

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Photos from: Olaf Booy, Steve Smith, Vicky White

For more information visit **www.nonnativespecies.org**

Produced by Olaf Booy, Max Wade and Vicky White of RPS

Himalayan Balsam

Species Description

Scientific name: *Impatiens glandulifera*
AKA: Policeman's Helmet, Indian Balsam, Jac y Neidiwr (Welsh)
Native to: West and central Himalayas
Habitat: Found mostly on river banks and in damp woodland, can grow in other damp habitat

A tall, attractive, annual herb with explosive seed heads. Although easy to identify as a mature plant with its pink-purple flowers, fleshy stem and characteristic leaves, the seedlings and last year's dead stems of this annual are more difficult to spot.

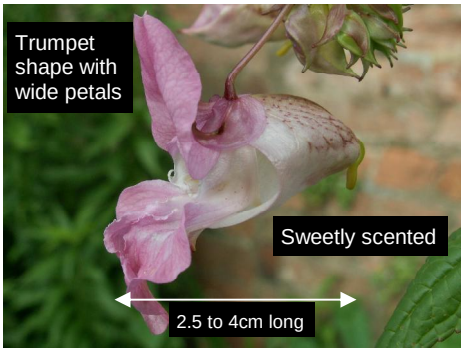
Introduced as a garden plant in the early 19th century and first recorded in the wild in 1855. Often favoured by the general public for its aesthetic appeal and is still deliberately planted on occasion. Now widespread in the UK, especially along urban rivers. Spreads solely by seeds, which are small and easily carried by wind or water.

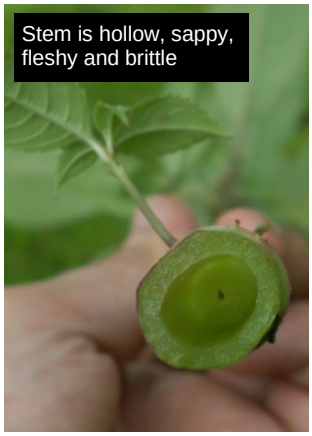
Out-competes native species in ecologically sensitive areas, particularly river banks. Where it grows in dense stands along river banks it can impede flow at times of high rainfall, increasing the likelihood of flooding. Die back of extensive stands over winter can leave river banks bare and exposed to erosion.

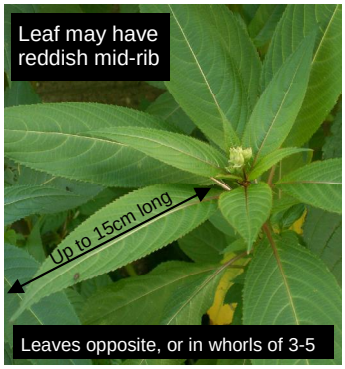
Himalayan balsam is listed under Schedule 9 to the Wildlife and Countryside Act 1981 with respect to England and Wales. As such, it is an offence to plant or otherwise allow this species to grow in the wild.

For details of legislation go to www.nonnativespecies.org/legislation.

Key ID Features



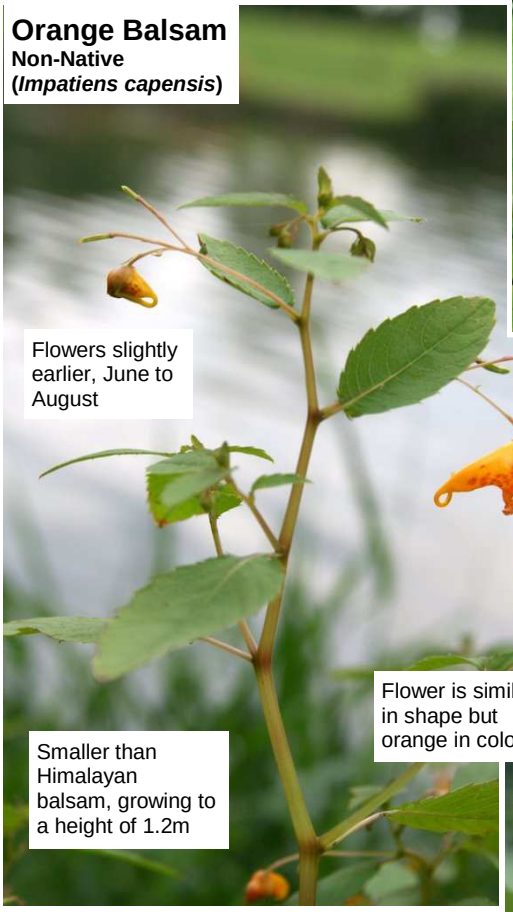




Identification throughout the year

Can be identified at most times of the year: March-June by its seedlings, stem and leaf shape, from July to September by its stem, leaf shape and flowers. More difficult to identify over winter (October to February), look for hay like remains and distinctive root structure.

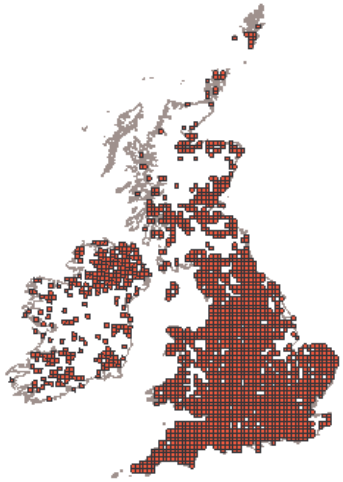
Similar Species



Orange balsam is much less aggressive than Himalayan balsam, forming smaller less dense stands

Distribution

Widespread and common across the whole of the UK. Primarily on riverbanks and in other damp areas.



Source: NBN Gateway. Check website for current distribution

References and further reading:

Blamey, M, Fitter, R and Fitter, A (2003) *"The Wild Flowers of Britain and Ireland. The Complete Guide to the British and Irish Flora".* A & C Black

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Stace, C (1999) *"Field Flora of the British Isles".* Cambridge University Press

Photos from: Olaf Booy, Mike Harris, Max Wade

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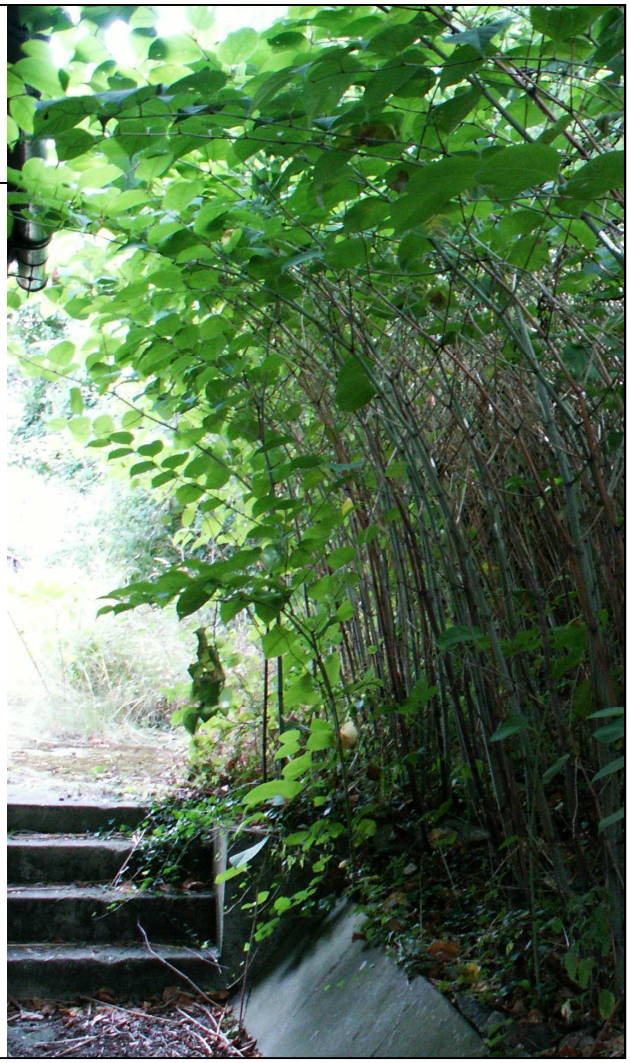
Japanese Knotweed



Species Description

Scientific name: *Fallopia japonica*
AKA: Japanese Bamboo, Pysen saethwr (Welsh), *Polygonum cuspidatum*, *Reynoutria japonica*
Native to: Japan, Taiwan, northern China
Habitat: Common in urban areas, particularly on waste land, railways, road sides and river banks

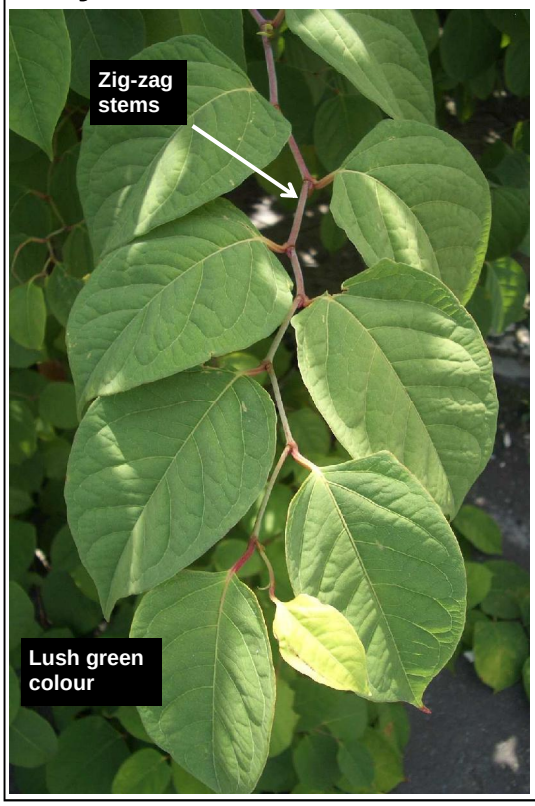
Tall herbaceous perennial with bamboo like stems. Often grows into dense thickets. Characteristic leaves and stems, persistence of last year's dead canes and distinctive rhizome (underground root-like stems) enables year round identification.

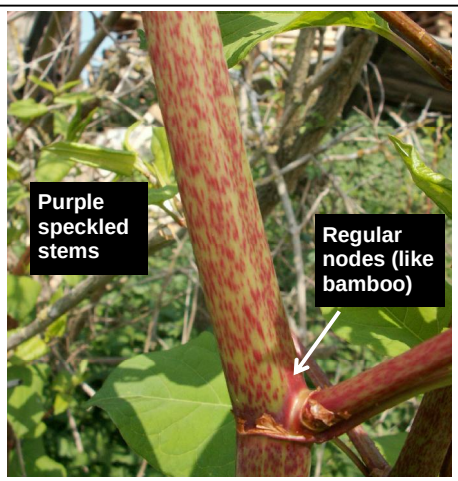
Introduced in the early 19th century as an ornamental plant. Now common and wide-spread across the UK. Spreads rapidly in the wild by natural means and as a result of spread by humans. Spread is solely by vegetative means, either fragments of rhizome or stem. Does not produce seed in the UK. Negative impacts include outcompeting native flora, contributing to river bank erosion and increasing the likelihood of flooding. Can also cause significant delays and cost to development as well as structural damage (it can grow through asphalt and some other surfaces).

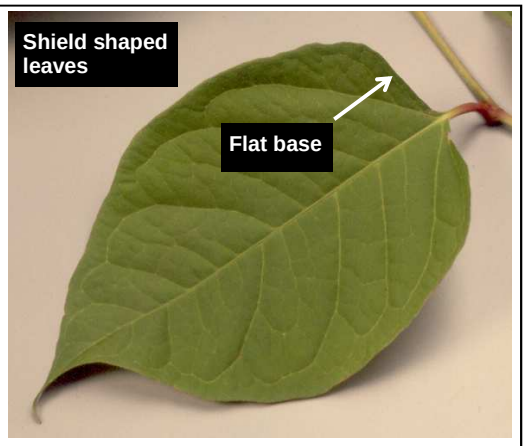
Japanese Knotweed is listed under Schedule 9 to the Wildlife and Countryside Act 1981 with respect to England, Wales and Scotland. As such it is an offence to plant of other-wise cause Japanese knotweed to grow in the wild. Under the Environmental Protection Act 1990, Japanese Knotweed is classified as controlled waste.

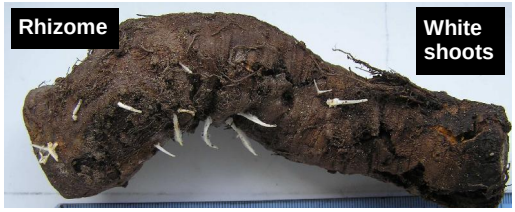
For details of legislation go to www.nonnativespecies.org/legislation.

Key ID Features

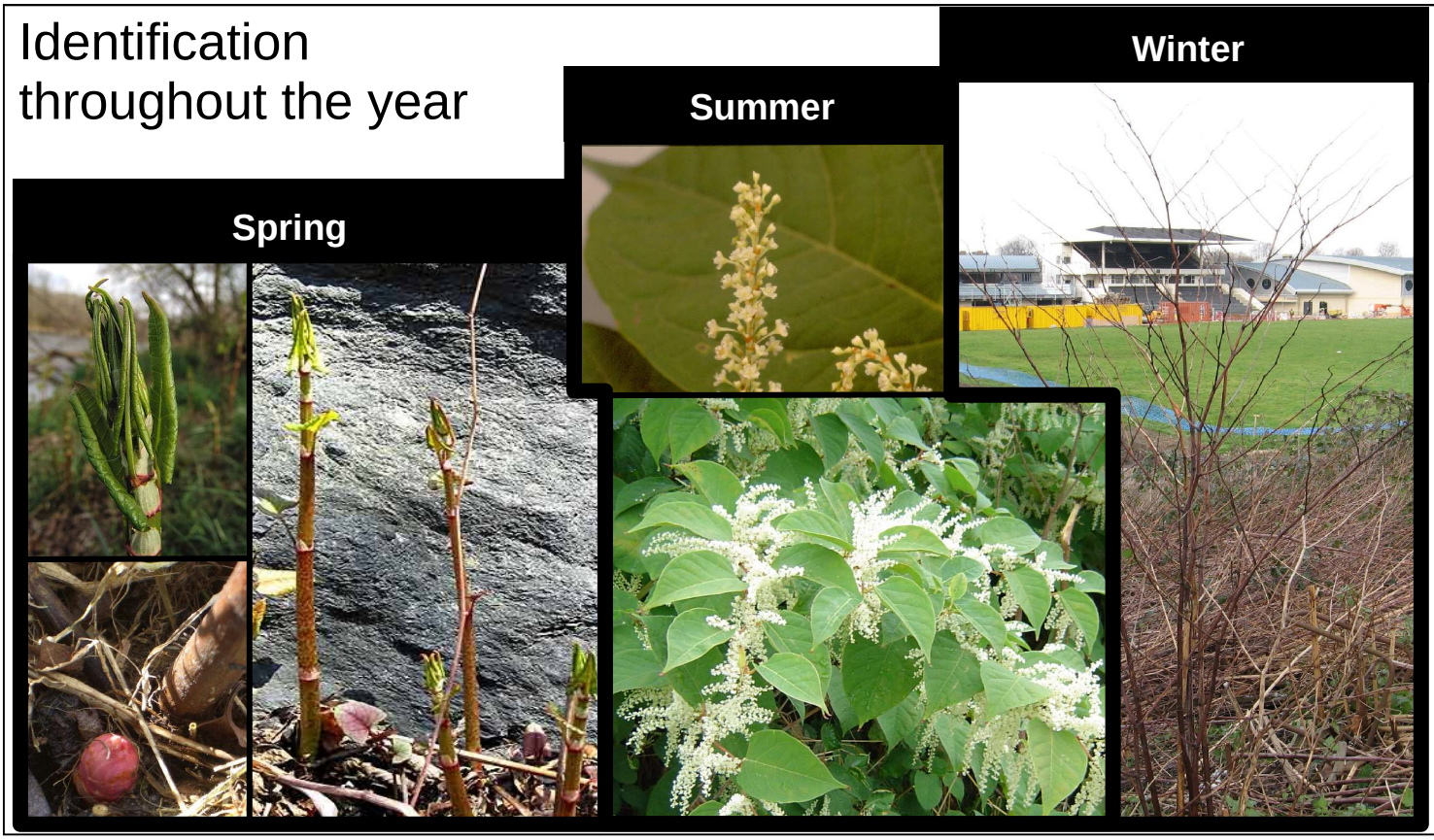






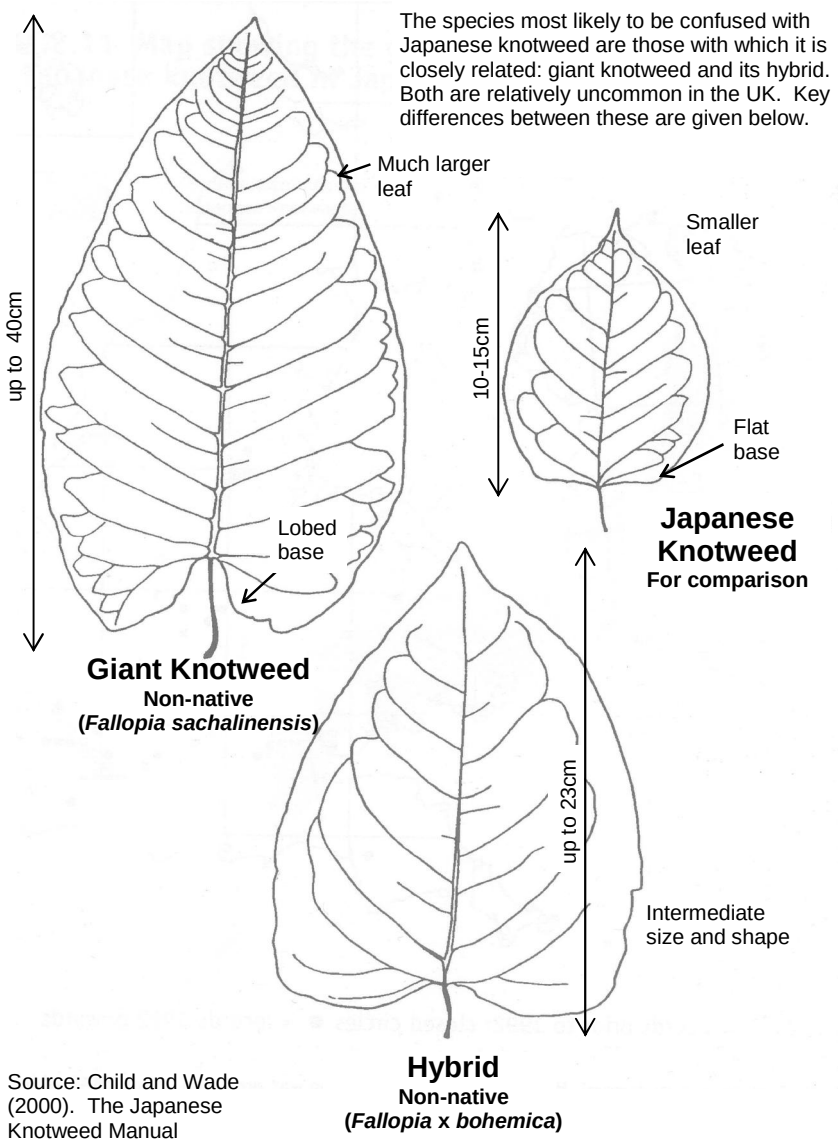


Identification throughout the year



Similar Species

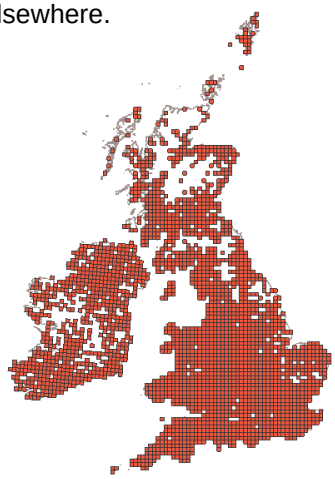
The species most likely to be confused with Japanese knotweed are those with which it is closely related: giant knotweed and its hybrid. Both are relatively uncommon in the UK. Key differences between these are given below.



Source: Child and Wade (2000). The Japanese Knotweed Manual

Distribution

Widespread and common across the UK. Notably extensive infestations are found in the south-west of England, south Wales and Greater London, however similarly extensive populations can also be found elsewhere.



Source: NBN Gateway. Check website for current distribution

References and further reading:

Blamey, M, Fitter, R and Fitter, A (2003) *"The Wild Flowers of Britain and Ireland. The Complete Guide to the British and Irish Flora."* A & C Black

Child, L E and Wade, P M (2000) "The Japanese Knotweed Manual". Packard

Environment Agency (2006) "*The Japanese Knotweed Code of Practice".* Environment Agency

Preston, C D, Pearman, D A and Dines, T A (editors) (2002) *"New Atlas of the British and Irish Flora".* Oxford University Press

Stace, C (1999) *"Field Flora of the British Isles".* Cambridge University Press

Photos from: Olaf Booy, Helen Parish, Max Wade, Vicky White