Appendix 11B:

Invasive Species Management Plan

Invasive Species Management Plan

Castletroy Wastewater Treatment Plant Upgrade Works, Limerick

DOCUMENT DETAILS

Client:	**Irish Water**
Project Title:	**Castletroy Wastewater Treatment Plant Upgrade Works, Limerick**
Project Number:	**210711**
Document Title:	**Invasive Species Management Plan**
Document File Name:	**ISMP F2 – 2023.03.01 - 210711**
Prepared By:	**MKO** **Tuam Road** **Galway** **Ireland** **H91 VW84**

Planning and Environmental Consultants

Rev	Status	Date	Author(s)	Approved By
01	Final	22/08/2022	RW	PR
02	Final	01/03/2023	RW	PR

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1. INTRODUCTION

1.1 Background

MKO were commissioned by JB Barry Consulting Engineers on behalf of Irish Water to carry out an Invasive Species Survey and Management Plan in relation to proposed upgrade works for Castletroy Wastewater Treatment Plant, Co. Limerick. The project involves upgrades to wastewater treatment infrastructure within the site as well as a new stormwater storage tank. The location of the site is shown in Figure 1.1. The WwTP is located approx. 20m from the Lower River Shannon SAC.

As part of site surveys carried out by MKO on the 6th of April 2022 and 23rd of July 2020, it was noted that there were infestations of Third Schedule species Himalayan Balsam (*Impatiens glandulifera*) and Giant Hogweed (*Heraceluem mantegazzianum)* within the site, particularly around the perimeters of the site. As a result, it was necessary to prepare a site-specific invasive species management plan to prevent the spread of Third Schedule invasive species during the proposed upgrade works.

The objectives of this report are summarised below:

- Provide general best practice guideline measures for the control and management of invasive species; and,
- Provide detailed recommendations for the treatment of invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011).

1.2 Legislative Framework

Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011) include legislative measures to deal with the dispersal and introduction of invasive alien species.

Non-native species subject to restrictions under Regulations 49 and 50 are included in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011). High impact invasive species on this list include, among others, Japanese Knotweed, Giant Hogweed, Giant Knotweed, Giant Rhubarb, Himalayan Balsam, Himalayan Knotweed, Bohemian Knotweed and Rhododendron. Vector materials which aid in the spread of these species include soil or spoil taken from places infested with Japanese Knotweed (*Fallopia japonica*), Giant Knotweed (*Fallopia sachalinensis*) or their hybrid Bohemian Knotweed (*Fallopia x bohemia*). Two vector materials are referred to in the regulations (Third Schedule Part 3), one is blue mussel seed and the second is:

''Soil or spoil taken from places infested with Japanese knotweed, Giant knotweed or their hybrid Bohemian knotweed".

Regulation 49

"any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place specified in relation to such plant in the third column of Part 1 of the Third Schedule, any plant which is included in Part 1 of the Third Schedule, shall be guilty of an offence."

Regulation 50

"a person shall be guilty of an offence if he or she has in his or her possession for sale, or for the purposes of breeding, reproduction or propagation, or offers or exposes for sale, transportation, distribution, introduction or release

(a) an animal or plant listed in Part 1 or Part 2 of the Third Schedule, (b) anything from

which an animal or plant referred to in subparagraph

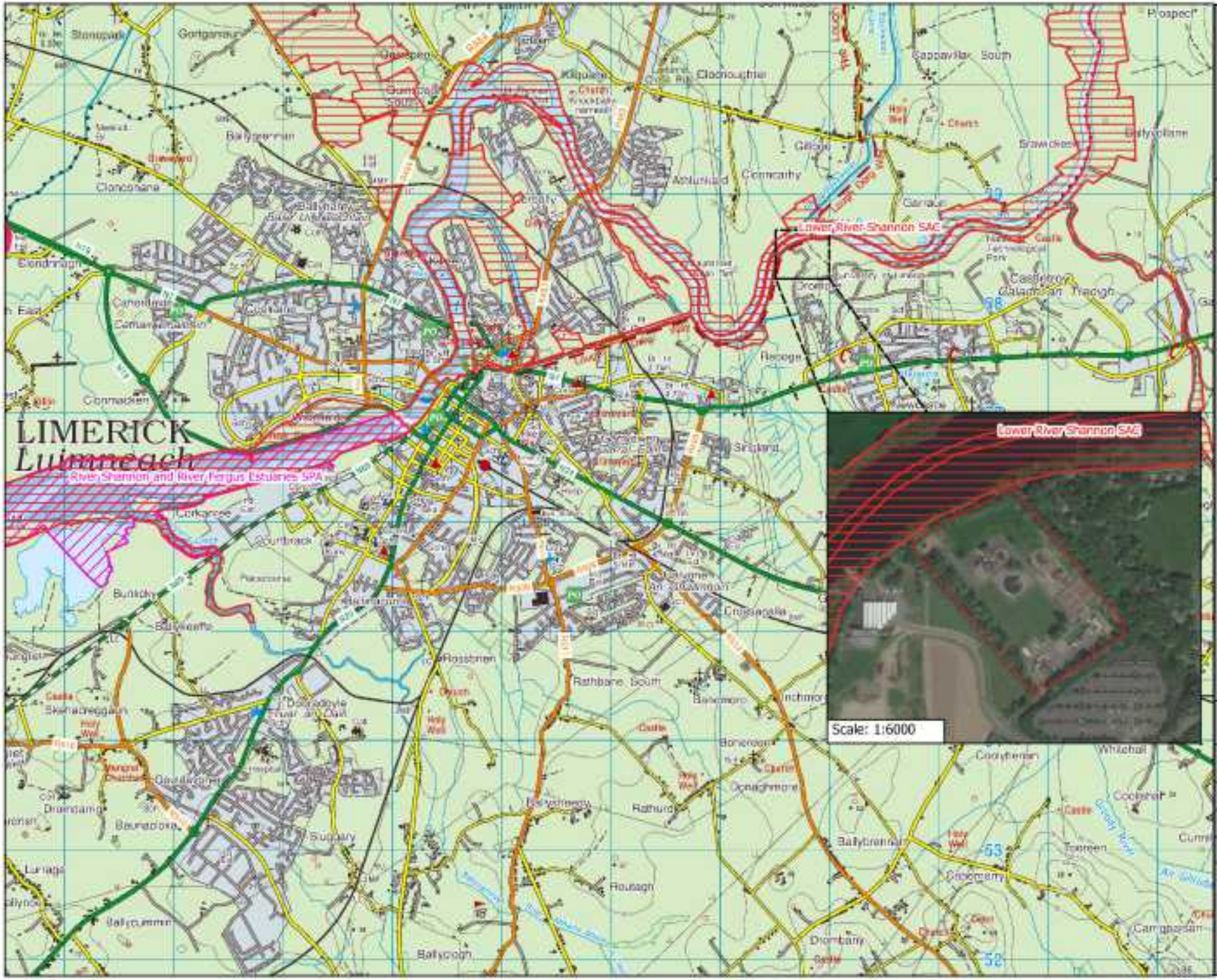
(a), can be reproduced or propagated, or

(c) a vector material listed in Part 3 of the Third Schedule,"

1.3 Guidance Documents

The following guidance documents and literature sources were consulted during the preparation of this report:

- NRA (2010). *Guidelines on management of noxious weeds and non-native invasive plant species on national roads*. National Roads Authority.
- Crushell, P., Foss, P., Hurley, C. & O'Loughlin, B. (2011). *County Kerry Invasive Species Survey 2011 - Pilot Mapping Study of the River Lee Catchment, Tralee*. Report prepared for Kerry County Council and The Heritage Council.
- Stokes et al. (2004). Stokes, K., O'Neill, K. & McDonald, R.A. (2004) *Invasive species in Ireland*. Unpublished report.
- Actions for Biodiversity 2017-2021, Ireland's 3rd National Biodiversity Action Plan.
- Department of Environment (2013). *An Invasive Alien Species Strategy for Northern Ireland*. www.doeni.gov.uk
- Inland Fisheries Ireland (2016) Best Practice for Control of Himalayan Balsam (*Impatiens glandulifera*)
- Irish Water (2016) Guidance on the Management of Himalayan Balsam (IW-AMT-GL-002)
- Irish Water (2016) Guidance on the Management of Giant Hogweed (IW-AMT-GL-001)
- Property Care Association (2015) Guidance Note – Management of Himalayan Balsam
- www.invasivespeciesireland.com



Map Legend

- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Site Boundary

Site Location

Project title: Castletroy Wastewater Treatment Plant	
Drawn by: AwdGM	Checked by: RW
Project No.: 210711	Drawing No.: Fig 1-1
Scale: 1:45000	Date: 23.03.22

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2. HIMALAYAN BALSAM RECORDED

Himalayan Balsam (*Impatiens glandulifera*) is an ornamental plant that was introduced to Ireland in the 19th century. This plant can produce thousands of seeds and has thrived in Ireland due to its warmer climate. Due to its rapid growth Himalayan Balsam shades out most native plant species and can leave banks bare when it dies back in wintertime. This in turn can lead to the erosion of soil and siltation of watercourses and fish spawning grounds. The plant has pink or white flowers which appear in June – October. Himalayan Balsam has shallow roots, and explosive seed pods that can expel seeds up to 7m from the parent plant. As a result, a standard exclusion zone of 7m is applied when working in proximity to this plant.

During walkover surveys of Castletroy WwTP, Himalayan Balsam was found growing extensively outside of the boundary of the site, along the River Shannon and adjacent areas. The infestation will ultimately require management at a catchment level and the focus for Irish Water would be on best-practice avoidance and biosecurity measures to avoid further spread from within the Wastewater Treatment Plant. Due to the existence of the plant outside of the WwTP boundary, annual control of the plant within the site is recommended.

The invasive species Himalayan Balsam was concentrated along the north of the site boundary, which is close to the River Shannon, where it is originating outside of the site boundary and encroaching across the palisade fence (Plate 2-1). An infestation exists within the boundary in the northwest corner, adjacent to the existing final effluent and storm overflow chamber and the drain which delineates the western boundary (Plate 2-2, Plate 2-3)(Figure 2-1). Some individual plants and an infested area were also identified along the east and beside the existing aeration system (Plate 2-4). An infested area was also identified to the southeast of the site.

A map showing the location of Himalayan Balsam recorded is shown in Figure 2-1.

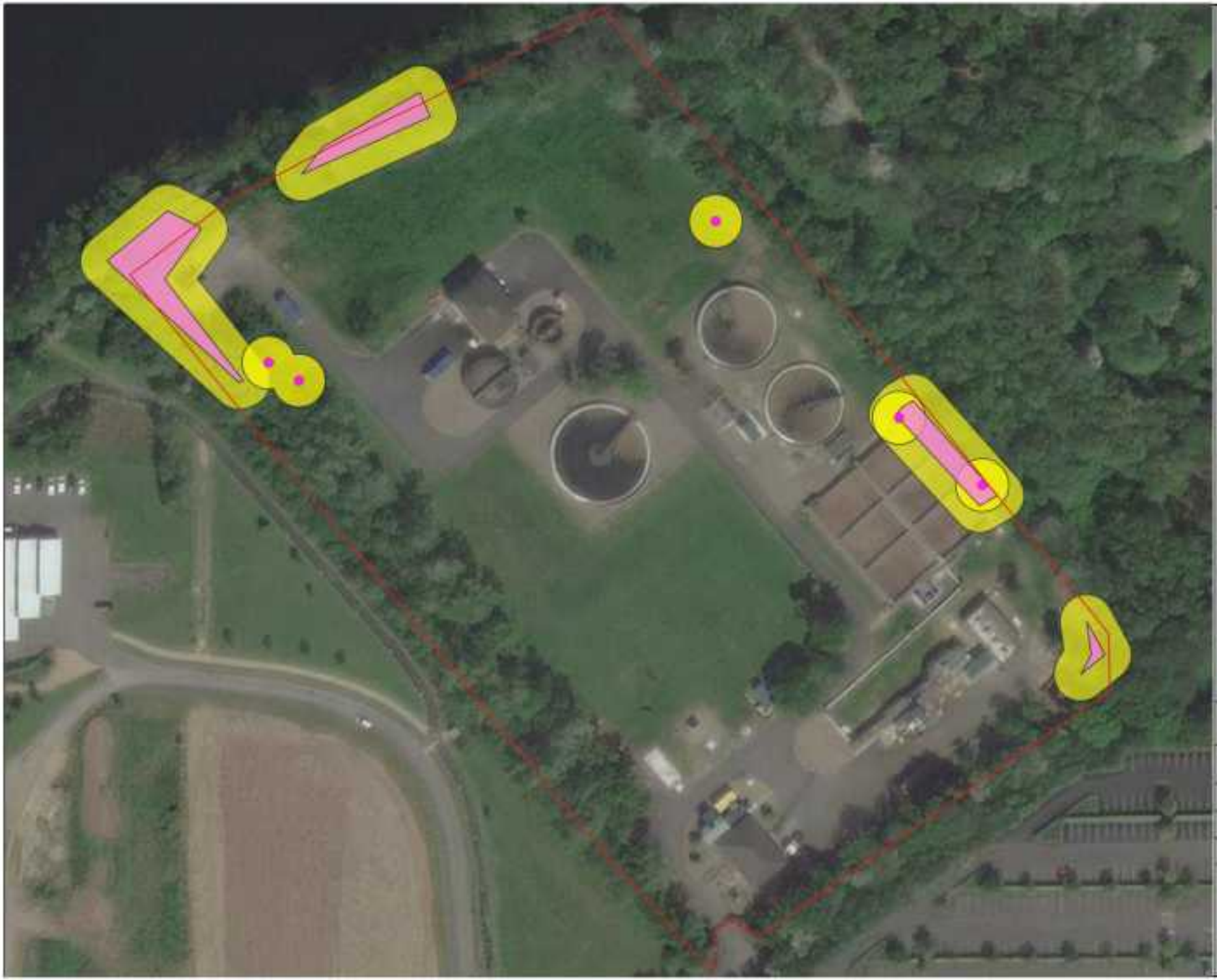
Plate 2-1 Himalayan Balsam at the northern boundary encroaching into the site from external lands.

Plate 2-2 Infestation to the northwest of the site adjacent to the existing final effluent and storm outfall chamber.

Plate 2-3 Infestation to the northwest of the site adjacent to the existing final effluent and storm outfall chamber.

Plate 2-4 Individual plants present adjacent to the existing aeration system.

Plate 2-5 Infestation outside of the site boundary along the public river walkway to the north.


Map Legend
Site Boundary
Himalayan Balsam (polygon)
Himalayan Balsalm point data
7-meter Buffer
N
Himalayan Balsam
Castletroy Wastewater Treatment Plant
RW
PR
210711
Fig 2-1
1:1300
24.06.22
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3. HIMALAYAN BALSAM MANAGEMENT PLAN

There are a number of options for the treatment of Himalayan Balsam including both chemical and mechanical. Due to the nature of the proposed works it will be necessary to achieve immediate eradication of the plant within proposed works areas in order to reduce the extent of infestation in advance of construction works. Hand-pulling the plant from proposed works areas is identified as the most appropriate control option for Himalayan Balsam at the site. The material will be kept within the site and left to dry out and die. Uprooted plants will be stockpiled and covered with jute material in order to block out light and degrade, since uprooted plants can potentially re-root form nodes in moist conditions. Infested areas within the site will be fenced off with a buffer of 7 meters and avoided where possible.

The following sections outline the steps that will be followed in order to achieve removal of the plant within the works areas and prevent any potentially contaminated material being removed off site.

3.1 Interim Before Construction Phase

Hand-pulling the plant from infested areas within the site in advance of construction phase is identified as the most appropriate control option for this species at the site.

- Himalayan Balsam hand-pulling will be supervised by a qualified ecologist and will be undertaken between the end of April to May 2023, when plants are visible but before seed pods have developed.
- To manually remove, stems will be gripped about 0.5m above the ground and carefully pulled.
- The uprooted material will be stockpiled within the site and covered with jute material in order to block out light and degrade. The stockpile will be located within an area of the site where it will be undisturbed. Indicative stockpile areas are shown in Figure 5-2.
- Post control monitoring will be carried out four weeks after the control operations to assess the need for further control in advance of construction.
- Any hand-pulling which needs to take place from June onwards will be carried out by a qualified ecologist using a plastic bag to carefully cover the seed heads.

3.2 Construction Phase

3.2.1 Pre-commencement

- A pre-commencement invasive species survey will be undertaken in advance of construction.
- Any persistent plants within works areas will first be removed by hand under supervision of the ecologist prior to works commencing and/or machinery and personnel accessing the area. This will avoid unnecessary disturbance to seed pods and potential dispersal of seed. Balsam plants will be removed by placing a plastic bag over the head of the plant to create a seal and pulling. Pulled plants will be stockpiled under jute material within the site in an area unlikely to be disturbed.
- Any current or previously mapped infested areas which can be avoided by the works will be fenced off to a 7-meter buffer.
- Throughout much of the site, it will not be possible to avoid areas that are contaminated with Himalayan Balsam. All works within 7m of Himalayan Balsam will be supervised by a suitably qualified ecologist.

- A Toolbox Talk will be given by the ecologist in relation to the management of Himalayan Balsam within the site.
- The entire site will be treated as a contaminated zone. A bio-secure zone will be set up at the entrance to the site. The bio-secure zone will comprise heras panels and/or posts and geotextile membrane in order to form a contained area for brush down of personnel and machinery to take place. Warning signage will be erected to direct personnel through the bio-secure zone prior to leaving the contaminated construction site. Clothes and shoes will be brushed down within the bio-secure area to prevent any seed being carried off site. Any material gathered here will be collected and kept within the site. The biosecure zone is shown on Figure 5-2.
- As well as personnel, any machinery will be fully brushed down prior to moving away from the works. Power washing may also be carried out, however, all washings generated during clean down will need to be fully contained and discarded within the site away from any watercourse. It is recommended that power washing be avoided due to proximity to watercourses and potential for contaminated material to escape.
- On completion of the works biosecurity measures will be removed under the supervision of the Ecologist.

3.2.2 Excavations

- Contaminated areas where pipework is to be laid can be excavated and back-filled using the original excavated soil, resulting in this soil being left in-situ.
- Any other excavated soil to be isolated and contained within the site, either within the compound area or as a bunded stockpile such as indicated on Figure 5-2, and re-used in landscaping and infilling.
- It is envisaged that no soil is to be removed from the site but is to be reinstated within the site, thus negating the need for transport off-site, further risk of spread, and licencing requirements. Should potentially contaminated spoil be required to be removed from the site, it will be transported to a suitably licenced waste facility and will require a licence from the NPWS prior to its transportation.

3.3 Post-Construction

- Post control monitoring will be carried out four weeks after the control operations to assess the need for further control and additionally on at least an annual basis, since seeds can persist in soil for up to 3 years, and since the infestation extends beyond the boundary of the WwTP.
- Uprooted areas and areas of bare soil post-construction will be re-seeded with native seed or replanted with extirpated native species, for habitat enhancement and in order to increase native competition and reduce the potential for re-establishment of Himalayan Balsam in these areas.

4. GIANT HOGWEED RECORDED

Giant Hogweed (*Heracleum mantegazzianum*) has been identified as one of the highest risk non-native invasive species in Ireland. It was introduced from the Caucasus region to Victorian gardens as an ornamental plant in the 19th Century. Since then, it has escaped into the wild and has scattered throughout the country. Giant hogweed grows in rich, moist soil and is commonly found along streams, ditches, roadsides and wet meadows. In its native range it has adapted to develop thousands of seeds in order to persist in colder climates, however, this has resulted in it becoming invasive in our milder climate where seeds can germinate more readily. Seeds spread by wind, water, animal and human influence and can remain viable in the soil for up to 15 years.

Giant hogweed is considered to be a significant danger to public health. The stems, edges and undersides of the leaves are coated with fine hairs containing phototoxic sap. The slightest contact with human skin can cause severe dermatitis in the presence of sunlight. Effects may include welts, rashes, and blistering. The sap can also cause temporary or permanent blindness following contact with eyes. Animals grazing Giant hogweed may be susceptible to poisoning or digestive disorders. The reaction can be activated by UV radiation only 15 minutes after contact, with a sensitivity peak between 30 minutes and 2 hours after contact. After a period of about 24 hours skin may redden and blister, followed by an inflammatory reaction after 3 days. Approximately one week later, hyperpigmentation of the skin occurs on the affected areas which can last for months and the skin may remain sensitive to UV light for years. **Due to the serious health risks associated with Giant hogweed, it is recommended that all methods of control are carried out by trained and experienced personnel.**

During walkover surveys of Castletroy WwTP, most recently the 6th of April 2022, Giant Hogweed was found growing extensively outside of the boundary of the site, along the River Shannon and adjacent areas. The infestation will ultimately require management at a catchment level and the focus for Irish Water would be on best-practice avoidance and biosecurity measures to avoid further spread from within the Wastewater Treatment Plant.

Giant Hogweed was found along most of the perimeter of the WwTP, however its growth was most extensive along the northwest (Plate 4-1) and western boundary (Plate 4-2), where it was found often extending from the palisade fence boundary across grassland, and was seen to have invaded wooded areas and grassland along the western boundary. Scattered infestations and individual plants are also found along the south-eastern (Plate 4-3) and eastern boundary, with one plant recorded amongst trees in the centre of the site.

A map showing the location of Giant Hogweed infestations recorded is shown in Figure 4-1.

Plate 4-1 Infestation of Giant Hogweed along the northwestern boundary.

Plate 4-2 Infestation along the drain to the west of the site.

Plate 4-3 Infestation within the southeast corner of the site.


Map Legend
Site Boundary
Giant Hogweed point data
Giant Hogweed Infestation extent
4-meter Buffer
N
Giant Hogweed
Castletroy Wastewater Treatment Plant
RW
PR
210711
Fig 4-1
1:1300
24.06.22
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5. GIANT HOGWEED MANAGEMENT PLAN

There are a number of options for the treatment of Giant Hogweed including both chemical and mechanical. Due to the nature of the proposed works it will be necessary to achieve immediate eradication of the plant within proposed works areas via spraying in order to reduce above-ground plant biomass in advance of construction works.

Soil within 4m of plants which have flowered and set seed is likely to contain vast quantities of seed and disturbance to these areas will be avoided unless required as part of a treatment/control measure. Seeds are typically concentrated in the top 50cm of soil. Infested areas within the site which can be avoided by the construction works will be fenced off with a buffer of 4 meters.

Everyone operating in areas infested with Giant Hogweed will be made aware of the health risks associated with this plant. Infestations will be fenced off including a 4m buffer zone and a warning notice erected. All parts of the plant must be avoided. Any person involved in control or treatment is at risk from direct contact or contact with small fragments of plant or sap released into the works area. Workers must wear protective synthetic water-resistant clothing. Gloves with long sleeves and protective goggles must also be worn. Care must be taken not to touch any exposed skin with gloves covered in sap. If skin is accidentally exposed then the affected area should be carefully washed with soap and water, then covered to prevent UV light reaching the area and medical advice sought.

A professional specialist contractor must be employed for treating any Giant Hogweed infestations and must carry out a detailed risk assessment prior to undertaking any survey/treatment/control measures.

The following sections outline the steps that will be followed in order to achieve removal of the plant within the works areas and prevent any potentially contaminated material being removed off site.

5.1 Interim Before Construction Phase

Immediate commencement of in-situ spraying of Giant Hogweed is identified as the most appropriate control option for this species at the site. Due to the proximity of watercourses around the site and the SAC, a suitable herbicide which is approved for use near watercourses will be required.

- An invasive species specialist with experience in Giant Hogweed and the appropriate PPE will be employed for eradication of the plant from within the WwTP.
- Herbicide treatment will only be carried out by suitably qualified personnel/contractors with strict reference to the product label, local land use, health and safety considerations, compliance with relevant legislation and adherence to Irish Water's Biocide Strategy and Policy.
- A Risk Assessment with regard to the hazards of working with and in proximity to the plant will be provided by contractors.
- Treatment has been carried out in 2022. Follow-up treatment will be carried out in May 2023 in order to treat any seedlings which may have germinated after first treatment.

5.2 Construction Phase

5.2.1 Pre-commencement

- A pre-commencement invasive species survey will be undertaken in advance of construction.
- Do not allow vehicle/machinery/personnel access to the infested area until the infestation has been treated by a Giant Hogweed Specialist and deemed not to present a health risk.

- Any current or previously mapped infested areas which can be avoided by the works will be fenced off to a 4-meter buffer, as per Figure 5-1 where possible.
- Where works within 4m of Giant Hogweed are unavoidable - these will be supervised by a suitably qualified ecologist.
- A Toolbox Talk will be given by the ecologist in relation to the management of Giant Hogweed within the site.
- The entire site will be treated as a contaminated zone. A bio-secure zone will be set up at the entrance to the site. The bio-secure zone will comprise heras panels and/or posts and geotextile membrane in order to form a contained area for brush down of personnel and machinery to take place. Warning signage will be erected to direct personnel through the bio-secure zone prior to leaving the contaminated construction site. Clothes and shoes will be brushed down within the bio-secure area to prevent any seed being carried off site. Any material gathered here will be collected and kept within the site. The location of the biosecure zone is shown in Figure 5-2.
- As well as personnel, any machinery will be fully brushed down prior to moving away from the works. Power washing may also be carried out, however, all washings generated during clean down will need to be fully contained and discarded within the site away from any watercourse. It is recommended that power washing be avoided due to proximity to watercourses and potential for contaminated material to escape.
- On completion of the works biosecurity measures will be removed under the supervision of the Ecologist.

5.2.2 Excavations

- Contaminated areas where pipework is to be laid to be excavated and back-filled using the original excavated soil, resulting in this soil being left in-situ.
- Any other excavated soil to be isolated and contained within the site, within the compound or within bunded stockpiles, and re-used in landscaping and infilling. Stockpile locations and associated bunding are shown in Figure 5-2.
- It is envisaged that no soil is to be removed from the site but is to be reinstated within the site, thus negating the need for transport off-site, further risk of spread, and licencing requirements. Should potentially contaminated spoil be required to be removed from the site, it will be transported to a suitably licenced waste facility and will require a licence from the NPWS prior to its transportation.

5.3 Post-Construction

- Ongoing monitoring for Giant Hogweed with follow-up spraying will be necessary in order to control Giant Hogweed within the site, particularly as it is pervasive in areas outside of the site.
- Uprooted areas and areas of bare soil post-construction will be re-seeded with native seed or replanted with extirpated native species, for habitat enhancement and in order to increase native competition and reduce the potential for re-establishment of Giant Hogweed in these areas.

It is not envisaged that excavated material will require removal from the site. However, if this is required it will need to completed under licence from the NPWS. Information required by the Wildlife Licensing Unit includes:

- Methods of removal;
- Methods of transport;
- Biosecurity measures;
- Copy of Management Plan;
- Timeframe for completion of works; and
- Documentary evidence that chosen landfill facility will accept the material.

In addition to this, if the Giant Hogweed material to be disposed of at a licenced waste facility has been treated through chemical means it may need to be classified as hazardous waste and transported and disposed to a fully licenced hazardous waste facility in accordance with Waste Collection Permit Regulations (S.I. No.820/2007 & Amended SI.No.87/2008) and European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations, S.I. No.324/2011.


Map Legend
Site Boundary
Giant Hogweed point data
Giant Hogweed Infestation extent
4-meter Buffer
Himalayan Balsam Point data
Himalayan Balsam Polygon
7-meter Buffer
N
Microsoft product screen shots reprinted with permission from Microsoft Corporation.
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Drawing Title
Invasive Species Buffer Zones and Site Layout
Project Title
Castletroy Wastewater Treatment Plant
Drawn By
RW
Checked By
PR
Project No.
210711
Drawing No.
Fig 5-1
Scale
1:1,300.002869
Date
24.06.22
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Map Legend
Site Boundary
Flood Bund
Double silt fence
Compound
Biosecurity Area
Contaminated stockpile
Flood bund
N
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Biosecurity Measures- Indicative Layout
Castletroy Wastewater Treatment Plant
RW
RW
210711
Fig 5-2
1:1,400
01.03.2023
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6. CONCLUSIONS

The bespoke invasive species management measures outlined in the document have been designed to follow the guidance outlined in Section 1.3. Careful implementation of the prescribed management measures will ensure that the works are conducted within the confines of legislation as outlined in Section 1.2.

This Management Plan has provided a record of baseline conditions and locations of invasive species within the wastewater treatment plant site. The outlined measures have been chosen in order to initiate immediate action on infestations within the site so that plant biomass is significantly reduced before construction commences, thereby reducing contaminated waste generated during works and reducing the potential for spread of invasive species. In addition, the outlined measures reduce the need for removal of contaminated material outside of the site, further reducing the risk of spread.

It should be noted that this management plan provides for the treatment of invasive species only within the works site boundary. Any invasive species that are located outside the construction footprint will be left undisturbed and will not be the subject of any treatment as part of the current proposal.

7. REFERENCES

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