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PROPOSED WASTE MANAGEMENT FACILITY

SEVERN ROAD, SEVERNSIDE, SOUTH GLOUCESTERSHIRE

FLOOD RISK ASSESSMENT

December 2021

Commissioned by: Cleansing Service Group Ltd.

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CONTENTS

APPENDICES

1.0 INTRODUCTION AND DEVELOPMENT DESCRIPTION

1.1 Project Introduction and Objectives

Cleansing Service Group (CSG) Ltd. has commissioned NSugg Ltd. to undertake a Flood Risk Assessment (FRA) to support a planning application for a waste management facility off Severn Road, Severnside, South Gloucestershire. This document represents a site-specific FRA for the proposed development and has been undertaken in accordance with the relevant planning policy and guidance outlined below.

1.2 Planning Policy and Guidance

1.2.1 National Planning Policy

The National Planning Policy Framework (NPPF)[1] and associated Planning Practice Guidance for Flood Risk[2] aim to steer new development to areas with the lowest risk of flooding.

New development must also ensure that flood risk is not increased elsewhere, and where appropriate, planning applications should be supported by a site-specific Flood Risk Assessment.

The NPPF recommends that development should only be allowed in areas at risk of flooding where the FRA (and the sequential and exception tests, as applicable) can demonstrate that:

a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;

b) the development is appropriately flood resistant and resilient;

c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;

d) any residual risk can be safely managed; and

e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

The guidance confirms that major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate.

1.2.2 Environment Agency Policy and Guidance

The Environment Agency's guidance for FRAs[3] confirms that planning applications for the following development proposals must be supported by a FRA:

- Development in Flood Zone 2 or 3 including minor development and change of use

[1] Ministry of Housing, Communities & Local Government, March 2012 (last updated: July 2021), National Planning Policy Framework.

[2] Ministry of Housing, Communities & Local Government, March 2014, Planning Practice Guidance, Flood Risk and Coastal Change.

[3] Environment Agency, March 2014 (last updated: February 2017), Guidance – Flood Risk Assessments if you're applying for planning permission.

- Development sites of more than 1 hectare (ha) in Flood Zone 1
- Development sites less than 1 ha in Flood Zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than rivers and the sea (for example surface water drains, reservoirs)
- Development in an area within Flood Zone 1 which has critical drainage problems as notified by the Environment Agency

The Agency's guidance supports the NPPF and specifies the requirements for FRAs based on the level of flood risk and the vulnerability of the proposed development to flooding.

In addition, Environment Agency consent is required for any proposed works or structures, in, under, over or within eight metres of the top of the bank of the watercourse, designated a 'main river', (or sixteen metres in the case of a tidal watercourse).

1.2.3 Local Policy and Guidance

The following documents provide local flood risk policy and guidance for development within Severnside, South Gloucestershire:

- South Gloucestershire Council's 2009 Level 1 Strategic Flood Risk Assessment (SFRA)[4] and 2011 Preliminary Flood Risk Assessment (PFRA)[5] present a summary of the local hydrology, potential sources of flood risk across the region and details of historic flood incidents.
- Bristol City Council, South Gloucestershire Council and Lower Severn Internal Drainage Board's 2011 Level 2 SFRA for Avonmouth/Severnside[6], which follows on from the Level 1 SFRA and supports decision making on land use planning and development control.
- South Gloucestershire Council's Local Plan Core Strategy (adopted December 2013) presents local planning policy up to 2027. The following policy requirements, relevant to flood risk and Severnside, are included in the Core Strategy:

  Policy CS1 – High Quality Design, states: *Development proposals will be required to demonstrate that they take account of the South Gloucestershire Strategic Flood Risk Assessments and provide, where appropriate, measures to manage flood risk and prepare surface water management plans.*

  Policy CS5 – Location of Development, states: *The economic potential of Severnside will be realised as a strategic location for a range of employment uses, subject to the resolution of flood risk, environmental and infrastructure issues and taking into account the most recent government legislation and guidance.*

  Policy CS35 – Severnside, states: *Land at Severnside will be safeguarded and developed for distribution and other extensive employment uses, including energy generation, broadly in line with the extant planning permissions dating from 1957 and 1958.*

[4] Scott Wilson, February 2009, South Gloucestershire, Strategic Flood Risk Assessment, Level 1 Report, Final Report.

[5] South Gloucestershire Council, August 2011, Preliminary Flood Risk Assessment. Final Report V03.

[6] Capita Symonds, February 2011, Strategic Flood Risk Assessment Avonmouth/Severnside, Technical Report Final.

Notwithstanding the differing planning status of individual land parcels, the Council will continue to work with landowners, Bristol City Council, the Local Enterprise Partnership and statutory agencies to provide a strategic development approach which will help to deliver development while mitigating site constraints, including flood risk, coastal protection, biodiversity, archaeology and transportation.

As outlined in the Local Plan Core Strategy, the application site benefits from the existing 1957/58 planning permission for Severnside which permits the development of new surfaces and the proposed office building. Therefore, this planning application and supporting FRA only relates to the proposed waste management facilities, which are outside of the scope of the extant 1957/58 permission.

1.3 Site Location

The application site is located off Severn Road, within the Avonmouth Severnside Enterprise Area, South Gloucestershire, BS10 7SE, and is outlined in red on the Site Location Plan, Figure 1. The application site forms part of a wider development site and only includes the proposed waste management facilities, which lie outside of the site's existing 1957/58 planning permission. The red line planning application boundary is also delineated from the wider site boundary within Appendix 1.

Figure 1. Site Location Plan

The application site is located within the broad, low-lying, Avonmouth Severnside region, approximately 1.8km from the tidal River Severn estuary and 10km north-west of Bristol city centre. The site currently comprises an area of undeveloped rough ground.

The total area of the application site, as indicated by the red line boundary on the Site Location Plan, is approximately 0.4 hectares. The Environment Agency's on-line flood map for planning indicates that the application site is located within Flood Zone 3, defined as land with a high probability of flooding, but is within an area that benefits from flood defences.

The National Planning Policy Framework (NPPF) and associated technical guidance confirms that all applications for proposed new development within Flood Zone 2 or 3 and

development proposals exceeding one hectare within Flood Zone 1 must be accompanied by a site-specific Flood Risk Assessment.

1.4 Topography and Existing Land Use

Review of Ordnance Survey mapping indicates that the local topography comprises flat and low-lying land adjacent to the mouth of the River Severn, with ground levels within the application site of approximately 8mAOD.

A topographic survey of the application site was undertaken in May 2021 and a copy of the survey is included as Appendix 2. The site survey confirms that ground levels within the application site are flat-lying and in the range 7.4mAOD to 7.6mAOD, locally influenced by soil heaps. Perimeter drains (rhines) bound the wider development site in all directions.

The application site is accessed off Severn Road and located within an area of industrial and commercial development, with surrounding land uses within 500m of the site including a gas storage facility, a waste incinerator, car auction site and warehouse distribution centres.

The application site currently comprises undeveloped rough ground; the access spine road from Severn Road has been constructed.

1.5 Geology

British Geological Survey mapping indicates that the local geology beneath the application site comprises superficial Tidal Flat Deposits (clay and silt) and Head (clay, silt, sand and gravel) overlying mudstone and halite-stone of the Triassic Mercia Mudstone Group[7].

A published geological log from an historic borehole installed on the north-eastern boundary of the application site confirms ground conditions comprising topsoil overlying interbedded soft to stiff silty clay and fine sand, with occasional peat layers to approximately 16.5m below ground level (mbgl). These superficial deposits overlie friable sandy clay (weathered marl), with the borehole terminating at 20mbgl. Groundwater was encountered at 1.5mbgl with a rest water level of 1.0mbgl.

Review of Cranfield University's soil maps[8] indicates that the soils beneath the application site are defined as Soilscape 21: loamy and clayey soils of coastal flats with naturally high groundwater.

1.6 Hydrological Features

The application site is low-lying and within the surface water catchment of the tidal mouth of the River Severn, which is located approximately 1.8km north-west of the site.

The application site lies within the Lower Severn Internal Drainage Board (IDB) area, and the IDB maintains the local watercourses, rhines and pumping stations to manage flood risk and to protect and enhance biodiversity.

The application site is bound by perimeter drains/rhines and the surrounding low-lying land is drained by a network of open drainage channels, as indicated on Figure 2.

[7] British Geological Survey, Geology of Britain Viewer, accessed 9th December 2021.

[8] Cranfield University's Soilscape Map, accessed 9th December 2021.

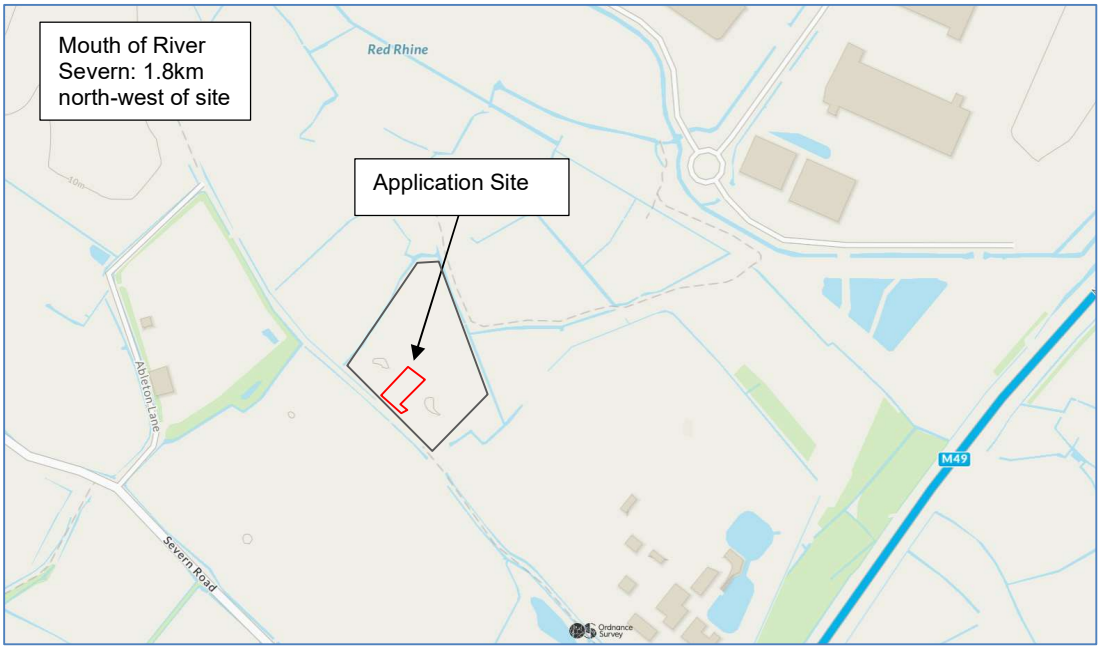


Figure 2. Local Hydrological Setting

1.7 Proposed Development and Flood Risk Vulnerability Classification

The proposed development comprises a waste management area containing 16 effluent tanks on a waterproof reinforced concrete slab and with a concrete bunded wall. The application site includes sections of the internal site access road, a lab/weighbridge portacabin office and a high tip waste reception container with associated infrastructure. Proposed site layout plans for the application site and wider development site are included within Appendix 3.

In terms of flood risk vulnerability classification, waste management facilities for hazardous waste are classified as 'more vulnerable'. This is discussed further in Section 2.3.

2.0 FLOOD RISK ASSESSMENT

2.1 Sources of Information

In addition to the flood risk planning policy and guidance outlined in Section 1.2, the following sources of information have been consulted during the preparation of this FRA:

- Environment Agency website – for information regarding surface water, reservoir and fluvial/tidal flood risk and outline flood zone maps.
- Environment Agency consultation response (Product 4 and Product 8) which provides site-specific flood risk data including modelled flood water levels, details of local flood defences and flood defence breach assessment. A copy of the consultation response received from the Environment Agency is included as Appendix 4.
- The Avonmouth Severnside Enterprise Area (ASEA) Ecology Mitigation and Flood Defence Project (www.asea-flood-ecology.co.uk) – details on ongoing works to provide a new flood defence scheme for Avonmouth Severnside.

2.2 Flood Hazard

All potential sources of flooding to the application site are considered within this section of the report.

2.2.1 Environment Agency Flood Zone Map and Fluvial/Tidal Flood Risk

The Environment Agency flood zone map presents information regarding the fluvial and tidal flood risk to the application site and is included as Figure 3 below. The flood zone map indicates that the application site is located within Flood Zone 3, defined as land with a high probability of flooding (1% or greater annual probability of river flooding and/or 0.5% or greater annual probability of sea flooding), but is within an area benefitting from flood defences.

Review of the Environment Agency's flood mapping confirms that the area of defended Flood Zone 3 is extensive across Avonmouth Severnside and is predominantly associated with the tidal River Severn / coastal flood risk.

Figure 4, presents the Environment Agency's fluvial/tidal flood risk map taking into account the effect of local flood defences. This indicates that the application site has a low risk of flooding from rivers or the sea (defined as between 0.1% and 1.0% annual probability) due to the presence of flood defences.

Figure 3. Environment Agency Flood Zone Map[9]

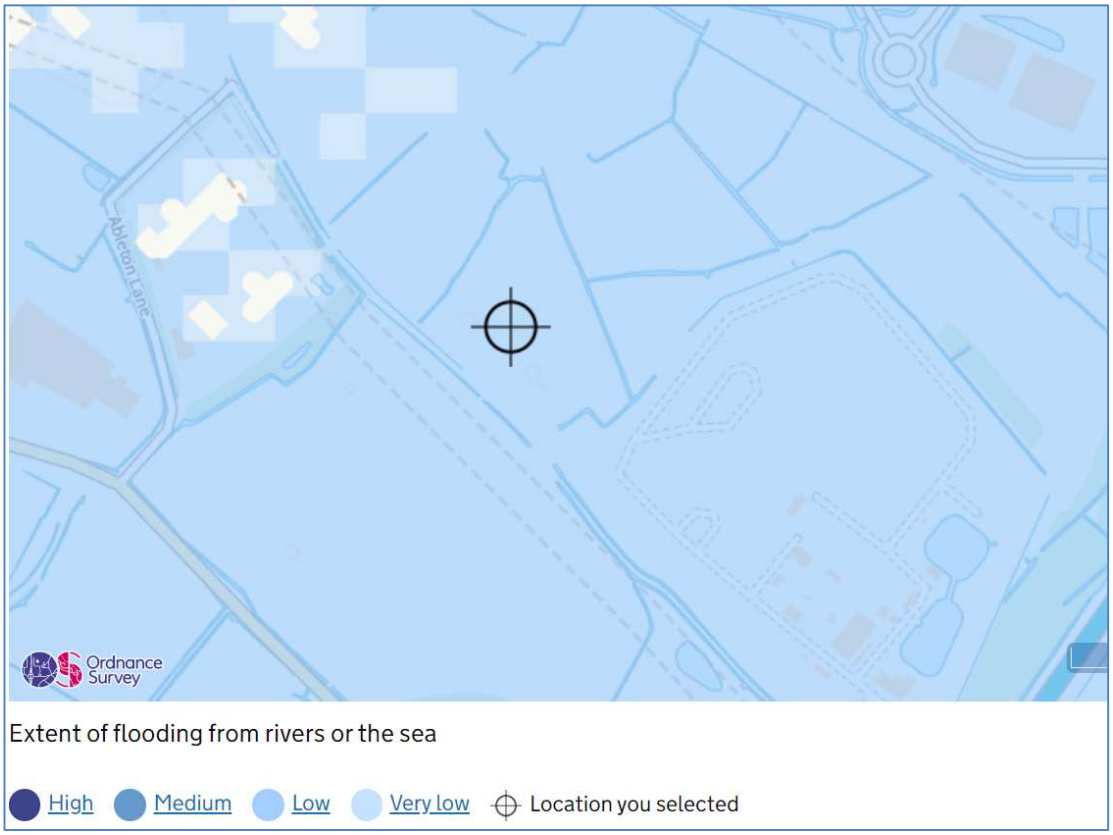


Figure 4. Environment Agency Flood Zone Map (taking into account the effect of flood defences)

[9] www.flood-map-for-planning.service.gov.uk accessed 10th December 2021.

The ASEA Ecology and Flood Defence Project includes the construction of 17km of improved flood defences along the River Severn to reduce flood risk to 2500 homes and businesses; the project will ensure flood risk is reduced for at least 60 years. The entire project is due for completion in 2026/27; the Environment Agency's consultation response (Appendix 4) indicates that the section adjacent to Old Passage and Severn Beach, in the vicinity of the application site, is due to be completed Autumn 2022.

The typical accepted lifetime for planning purposes, for commercial and industrial development, is 60 years. The Environment Agency's consultation response (Appendix 4) includes predicted flood water levels for the application site from the 2020 ASEA Flood Defence Project model, which takes account of the proposed new flood defences. The predicted flood water level data takes account of long-term sea level rise to 2098; this lifetime is considered appropriate and conservative for commercial/industrial development.

Peak predicted flood water levels are summarised below from the 2020 ASEA model:

Model Scenario	**Predicted Peak Flood Water Level (mAOD)**
0.5% (1 in 200 year) Post Development 2098 (new flood defences in place)	N/A (No Flooding Occurs)
0.1% (1 in 1000 year) Post Development 2098 (new flood defences in place)	7.77mAOD
0.5% (1 in 200 year) Post Development 2098 Breach of new defences	N/A (No Flooding Occurs)

The above peak flood water level data indicates that the application site would remain safe and dry during the design flood event (0.5% annual probability tidal flood event, with allowance for long term climate change), due to the presence of the flood defences.

The peak predicted flood water during the extreme, 0.1% annual probability flood event is 7.77mAOD; review of the site topographic survey confirms that this equates to peak flood water depths of 0.1m to 0.3m within the application site.

Therefore, the 2020 ASEA model results indicate that the application site is effectively within medium probability Flood Zone 2 (0.1% to 0.5% annual probability of tidal flooding), when the proposed flood defences are taken into consideration.

The Environment Agency's consultation response suggests that the future, 2110 scenario from the 2010 Avonmouth Severnside Level 2 SFRA should be the design scenario for 'more vulnerable' development. Figure 7.3 of this SFRA presents peak flood water depths for this future scenario (maximum results from two scenarios: scenario 1 – 200 year tidal and 2 year fluvial; scenario 2 – 100 year fluvial and 2 year tidal). Figure 7.3 is included within Appendix 4 and indicates peak flood water depths in the range 1.0m to 1.5m across the application site and surrounding area. Whilst a lifetime of 100 years is considered appropriate for 'more vulnerable' residential development, the development proposals are commercial/industrial, where a lifetime of 60 years is standard. In addition, the results of the 2010 Avonmouth Severnside Level 2 SFRA do not take account of the local flood defences currently being constructed under the ASEA Flood Defence Project

The 2020 ASEA model results (presented above) take into account the proposed flood defences and include climate change scenarios appropriate to the lifetime of the proposed

development; therefore, the 2020 ASEA model results are considered appropriate as the design flood event.

A residual risk remains in the event of a flood defence breach, this is discussed further in Section 2.4 and appropriate flood risk mitigation measures for the development are presented.

2.2.2 Other Potential Sources of Flooding

The local SFRAs, PFRA and online flood maps have been reviewed to identify any other potential sources of flood risk to the application site and evidence of historic flood events in the local area. This information is presented in Table 1 below.

Table 1: Severn Road, Severnside – Potential Sources of Flooding

Potential Source	Potential Risk at Application Site?	Reasoning
Fluvial Flooding	Yes	The Environment Agency's flood zone map for planning indicates that the application site is within Flood Zone 3 but benefits from the presence of local flood defences. Site-specific data provided by the Environment Agency confirms that the application site is protected by the ASEA Flood Defence Project, due to be completed in 2022. The 2020 ASEA flood model results confirm that the application site would remain safe and dry during the design tidal flood event (0.5% annual probability + climate change to 2098). The ASEA model also indicates that the site would remain safe and dry in the event of a flood defence breach, although no details of the breach location are provided. It is assumed that there is a residual risk of flooding to the application site in the event of a flood defence breach.
Tidal Flooding		
Flooding from High Groundwater	No	Figure 10 of the PFRA indicates that the application site lies within an area with low susceptibility to groundwater flooding (less than 25%). Figure 4B of the South Gloucestershire Level 1 SFRA confirms there are no recorded groundwater flood incidents within the vicinity of the application site. Historic borehole logs, indicate the likely presence of shallow groundwater beneath the application site, but the presence and flow of groundwater is likely to be limited by the low permeability ground conditions, with any shallow groundwater discharging to the perimeter drains.
Surface Water Flooding	No	The Environment Agency's online mapping confirms that the application site is defined as having a very low risk of surface water flooding (<0.1% annual probability of flooding). Refer to Figure 5 below. The proposed development will benefit from a surface water drainage strategy to minimise the risk of flooding from surface water runoff (refer to Section 3).
Flooding from Artificial Drainage Systems	No	Figure 4B of the South Gloucestershire Level 1 SFRA confirms there are no recorded flood incidents from sewers within the vicinity of the application site.
Flooding due to Infrastructure Failure	No	Review of the Environment Agency's online mapping indicates that the application site is not within the predicted maximum extent of flooding of local reservoir(s). The risk of flooding due to flood defence failure is considered within the fluvial/tidal flood risk.

Table 1 confirms that the only significant potential source of flooding identified within the application site is tidal/fluvial flooding associated with the River Severn and IDB drainage network. The tidal/fluvial flood risk is detailed above in Section 2.2.1 and concluded to be

very low due to the presence of local flood defences, with a low residual risk in the event of flood defence breach. Appropriate flood risk mitigation measures are discussed in Section 2.4.

Figure 5 presents the Environment Agency's surface water flood map for the application site; this confirms the risk of surface water flooding is very low (<0.1% annual probability).

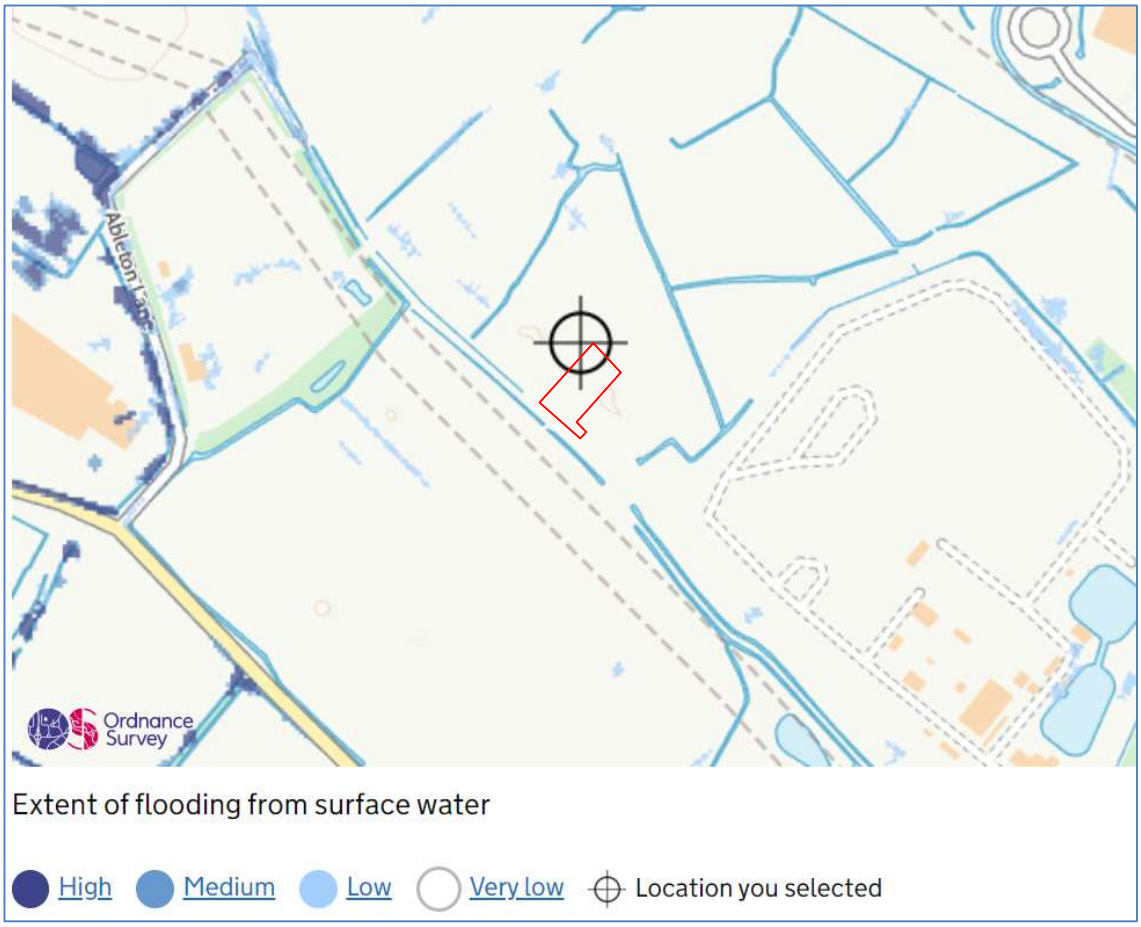


Figure 5. Environment Agency Surface Water Flood Map

2.2.3 Historic Flooding

Review of the Environment Agency's online historic flood map confirms that the application site is not within an area that has previously recorded flooding[10].

Figure 4B of the South Gloucestershire Level 1 SFRA indicates that the application site is not within an historic flood outline and there are no recorded flood incidents from any sources within 1km of the site.

[10] https://environment.data.gov.uk/DefraDataDownload/?mapService=EA/HistoricFloodMap&Mode=spatial accessed 10th December 2021.

The application site is located within the Environment Agency flood warning area[11] for the Severn Estuary at Oldbury-on-Severn, Northwick and Avonmouth including Aust and Old Passage.

2.2.4 Climate Change

The Environment Agency's climate change allowances guidance[12] confirms that rainfall, sea levels and river flows are predicted to increase as a result of climate change, which must be considered throughout the lifetime of the proposed development (60 years).

The application site lies within the Severn River Basin District, where sea levels are predicted to rise between 1.21m (higher central allowance) and 1.62m (upper end allowance) between 2000 and 2125.

The Environment Agency has provided predicted flood water level data from the 2020 ASEA flood model, which takes account of long-term climate change to 2098, beyond the anticipated 60 year lifetime of the development. The ASEA Flood Defence Project has been designed to protect the Avonmouth Severnside area, including the application site, from tidal/fluvial flooding for at least 60 years, throughout the lifetime of the proposed development.

2.3 The Sequential Test & Environment Agency Flood Zone Compatibility

As set out in the NPPF, the aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding (Flood Zone 1). This FRA has confirmed that the application site is protected by the ASEA Flood Defence Project, with the site remaining safe and dry during the design flood event (0.5% annual probability tidal event + climate change to 2098).

The residual risk of flooding, in the unlikely event of a flood defence breach, is considered below.

The application site is located within the Avonmouth Severnside enterprise area, and benefits from 1957/58 planning permissions which remain extant for the majority of the proposed infrastructure. This planning application relates only to those elements of the development which lie outside of the 1957/58 permissions.

The proposed development of a waste management facility for hazardous waste is classified as 'more vulnerable' in flood risk terms. Table 3, Paragraph 067 of the Planning Practice Guidance, confirms that 'more vulnerable' development is appropriate within Flood Zone 3a if the Exception Test is passed. In order to pass the Exception Test:

1. The sustainability benefits of the development to the community must outweigh the flood risk; and
2. The development must be safe for its lifetime, taking into account the vulnerability of its users, and it must not increase flood risk elsewhere.

This FRA demonstrates that the application site is at low risk of flooding due to the presence of local flood defences. The proposed development will provide a facility for the treatment of hazardous waste. Section 3 presents details of a proposed flood compensation pond, to

[11] www.riverlevels.uk accessed 10th December 2021.

[12] Environment Agency, February 2016 (last updated: October 2021), Guidance: Flood Risk Assessments: Climate Change Allowances.

ensure the development does not increase flood risk elsewhere. Therefore, it is concluded that the development passes the relevant requirements of the Exception Test.

2.4 Flood Risk Mitigation Measures

As outlined above, the application site is protected from tidal flooding by local flood defences for the design flood event throughout the lifetime of the development. The potential risk of flooding from all sources is assessed as low or very low.

However, due to the residual risk of flooding, in the unlikely event of a flood defence breach in combination with extreme tidal levels, it is proposed that flood mitigation design measures be incorporated within the proposed development.

Whilst the results of the 2020 ASEA flood model indicate that the application site would remain safe and dry in the event of a flood defence breach, no details regarding the assumed breach location are provided. It is also acknowledged that the local flood defences are scheduled for completion late 2022.

The results of the 2010 Avonmouth Severnside Level 2 SFRA modelling, which does not take account of the ASEA Flood Defence Project, predict a peak flood water depth of 1.0m to 1.5m across the application site and surrounding area for the worse-case flood scenario for 2110 (refer to Section 2.2.1).

Therefore, due to the uncertain residual risk in the event of a flood defence breach, the following flood risk mitigation measures are recommended:

- Current site topographic levels within the area of proposed development are 7.4mAOD to 7.6mAOD. The development plans confirm that the slab shall be constructed with a finished level of 8.1mAOD and the 1.0m high perimeter concrete bund wall shall therefore be constructed to an elevation of 9.1mAOD (refer to Appendix 3). The perimeter bund wall would act as a flood defence, protecting the facility from flooding to water depths of up to 1.5m above existing site levels, in the unlikely event of a flood defence breach.

- For the limited development in the application area located outside of the concrete bund wall (offices), it is recommended that floor levels be raised a minimum of 300mm above finished site levels (i.e. minimum floor level of 8.4mAOD). In addition, it is recommended that flood resilient design measures be incorporated to a minimum elevation of 600mm above site levels (i.e. to a minimum elevation of 8.7mAOD). Appropriate flood resilient design measures are detailed within the Environment Agency's 2007 guidance: *Improving the flood performance of new buildings: flood resilient construction.* Such measures would reduce the potential impacts to the development should flooding occur, and could include: raising of electrical sockets, wiring and meters and the use of water compatible flooring materials and water compatible fittings.

- It is recommended that a Flood Warning & Evacuation Plan would be prepared for the development in accordance with the Environment Agency's template (Appendix 6). The site manager would sign up to the Environment Agency's free Flood Warning Service and the Flood Warning & Evacuation Plan would detail the appropriate actions to be followed in the event of a Flood Alert or Flood Warning being issued.

- A surface water drainage strategy and flood compensation pond have been designed for the development by others (Section 3) to ensure the development would not increase flood risk to others.

3.0 SURFACE WATER MANAGEMENT

A surface water drainage strategy and flood compensation pond have been designed for the application site and wider development site, by Reuby & Stagg Ltd., Consulting Civil & Structural Engineers; a copy of the proposed strategy is included as Appendix 5.

In summary, surface water runoff generated within the bunded area containing the waste treatment silos shall discharge to a sealed drainage system and be routed through the waste treatment facility prior to consented discharge to sewer. Runoff from the limited area of the application site located outside of the bunded area shall discharge to the adjacent rhine via a full retention oil separator.

A flood compensation pond shall be provided to the north-east of the site; this has been sized in consultation with the Lower Severn IDB to represent 4.5% of the total site area.

4.0 SUMMARY AND CONCLUSIONS

This report represents a site-specific Flood Risk Assessment to support the proposed development of a waste management facility off Severn Road, Severnside, South Gloucestershire.

The development site benefits from the existing 1957/58 planning permission for Avonmouth Severnside; therefore, this planning application and supporting FRA only relates to the proposed waste management facilities, which are outside of the scope of the extant 1957/58 permission.

The application site currently comprises an area of undeveloped rough ground.

The Environment Agency flood zone map for planning indicates that the application site is located within defended Flood Zone 3 associated with the tidal River Severn; therefore, a detailed site-specific FRA is required.

A review of all potential sources of flooding to the application site has been undertaken and the Environment Agency has been consulted to obtain site-specific predicted flood risk information.

The application site has not recorded flooding in the past and is defended from flooding by existing flood defences which are currently being upgraded under the ASEA Flood Defence Project, due for completion in the vicinity of the site in late 2022.

Site-specific predicted flood water level data have been provided by the Environment Agency from the 2020 ASEA, which takes account of the proposed flood defences. The model indicates that the application site would remain safe and dry during the design flood event (0.5% annual probability tidal flood event with climate change to 2098). Therefore, the risk of tidal flooding is low due to the presence of flood defences.

The FRA concludes that the risk of flooding from all potential sources is assessed as low or very low. However, it is acknowledged that the site is at residual risk of flooding in the very unlikely event of a breach of the local flood defences combined with an extreme tidal flood event.

The following flood risk mitigation measures are therefore recommended for the development:

- Current site topographic levels within the area of proposed development are 7.4mAOD to 7.6mAOD. The development slab has a proposed finished level of 8.1mAOD and a 1.0m high perimeter concrete bund wall constructed to an elevation of 9.1mAOD. The perimeter bund wall would therefore act as a flood defence, protecting the facility from flooding to water depths of up to 1.5m above existing site levels, in the unlikely event of a flood defence breach.

- For the limited development in the application area located outside of the concrete bund wall, (offices), it is recommended that floor levels be raised a minimum of 300mm above finished site levels (i.e. minimum floor level of 8.4mAOD) and that flood resilient design measures be incorporated to a minimum elevation of 600mm above finished site levels (i.e. to a minimum elevation of 8.7mAOD). Flood resilient design measures would reduce the potential impacts to the development should flooding occur, and could include: raising of electrical sockets, wiring and meters and the use of water compatible flooring materials and water compatible fittings.

- It is recommended that a Flood Warning & Evacuation Plan be prepared for the development and detail the appropriate actions to be followed in the event of a Flood Alert or Flood Warning being issued.

- A surface water drainage strategy and flood compensation pond have been designed for the development to ensure no increased flood risk to others.

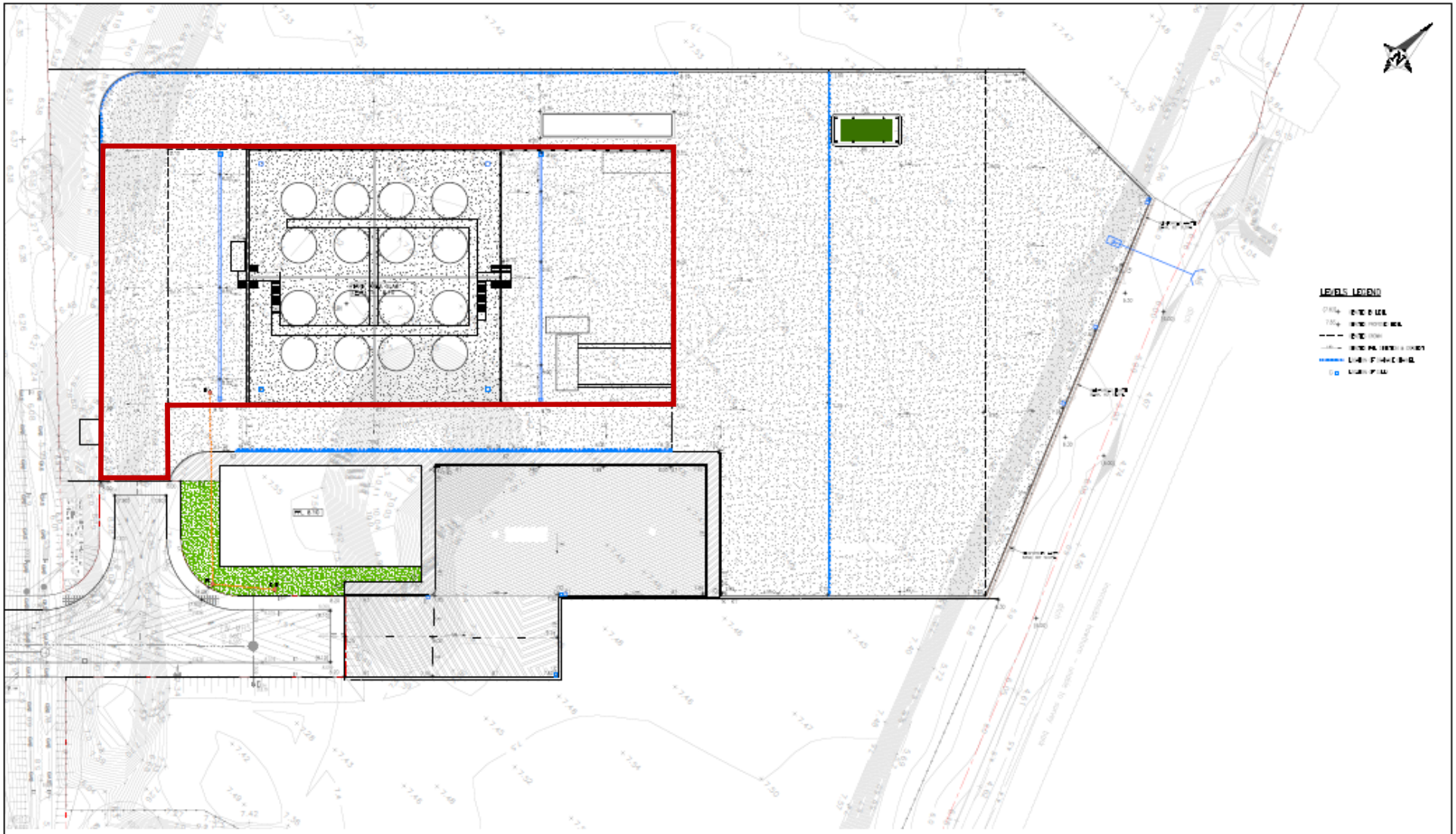
This FRA concludes that the proposed development of a waste management facility, classified as ‘more vulnerable’ development, off Severn Road, Severnside is appropriate and sustainable with regards to flood risk.

5.0 CLOSURE

This report has been prepared by Nicola Sugg (trading style of NSugg Limited) with all reasonable skill and care, and in accordance with the services agreed with CSG Ltd. Relevant information provided by CSG Ltd. has been accepted in good faith as being accurate and valid. This report is based on the relevant guidance and legislation in force at the date of the report and should be reviewed if such guidance and legislation are amended or superseded.

This report is for the exclusive use of CSG Ltd.; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from Nicola Sugg.

APPENDIX 1



DRAFT

P1	26/10/21	DRAFT ISSUE	MPD
rev	date	description	initials

Project: CSG, PLOT 6, AREA H&I, SEVERNSIDE

Client / Architect

Title: LEVELS LAYOUT

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checked MD

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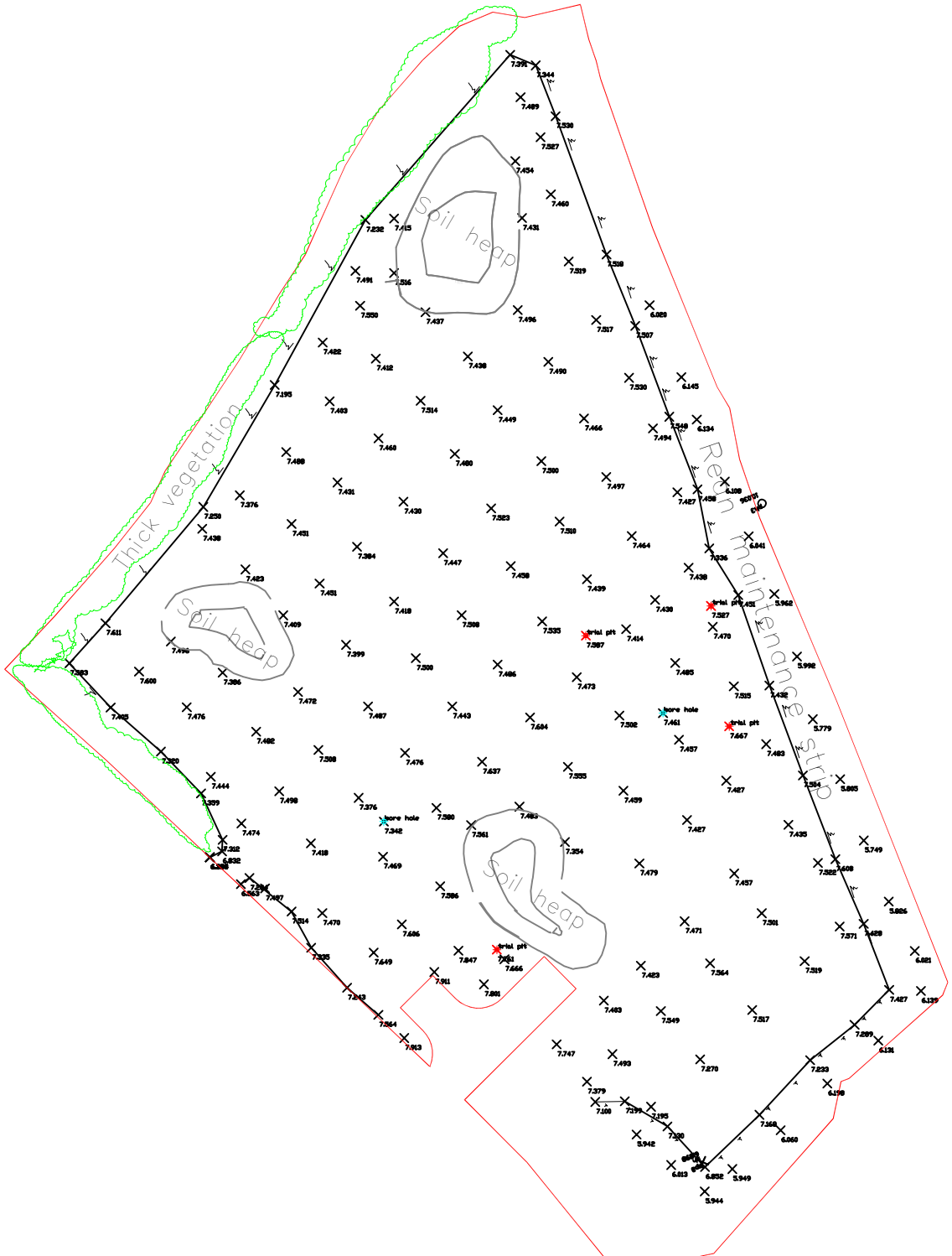
RISK SCHEDULE

ITEM	DESCRIPTION OF RISK OF ACTION
⚠	Specific health and safety risks associated with these works are highlighted with the caution symbol adjacent to the item of risk. Please refer to risk schedule contained on individual drawings.
	Unless highlighted there are no specific health and safety risks associated with these works, as a direct result of our design, apart from the common issues associated with construction that will need to be assessed by a competent contractor prior to the undertaking of any works.

APPENDIX 2



BRITANNIA Civil Engineering

Project

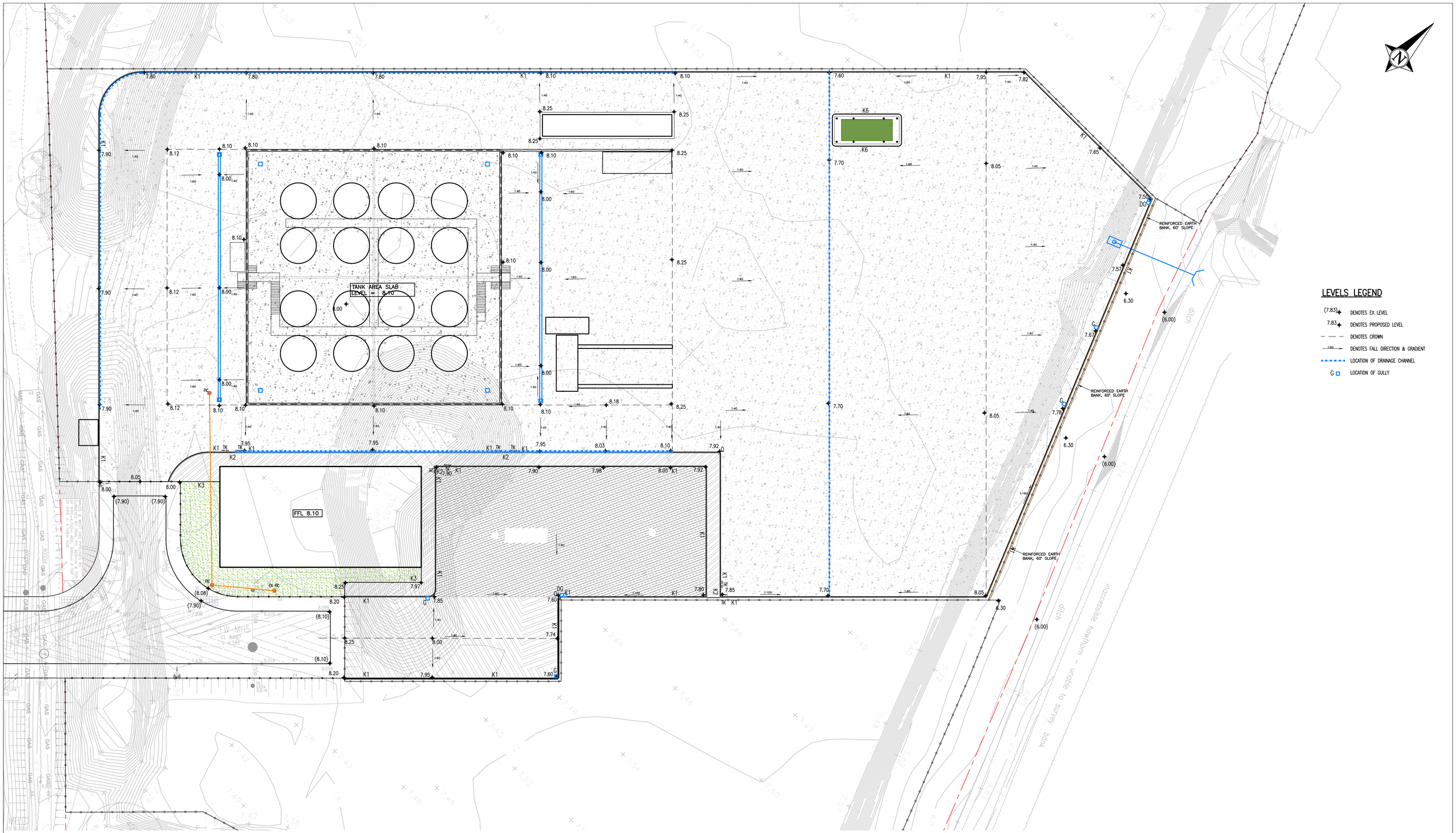
PLOT 6 - SEVERNSIDE

Title

LEVEL SURVEY

Scale	Size	Date
1:500	@A1	May 2021

APPENDIX 3



LEVELS LEGEND

- (7.83) ✦ DENOTES EX LEVEL
- 7.83 ✦ DENOTES PROPOSED LEVEL
- DENOTES CROWN
- 1:60 DENOTES FALL DIRECTION & GRADIENT
- LOCATION OF DRAINAGE CHANNEL
- G LOCATION OF GULLY

NOTES

1. THIS DRAWING IS COPYRIGHT.

2. DO NOT SCALE THIS DRAWING.
THE CONTRACTOR IS TO BRING TO THE NOTICE OF THE ENGINEER ANY DISCREPANCIES CONTAINED IN THIS DRAWING PRIOR TO WORK COMMENCEMENT.

3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST SUB-CONTRACTORS DRAWINGS AND THE SPECIFICATION.

HEALTH & SAFETY:

ALL WORKS TO BE CARRIED OUT BY A CONTRACTOR COMPETENT TO UNDERTAKE THE CONSTRUCTION OF WORKS AS INDICATED ON THIS DRAWING. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE JOB SPECIFIC RISK ASSESSMENT. THE HAZARDS NOTED ARE IN ADDITION TO THE NORMAL HAZARDS AND RISKS FACED BY A COMPETENT CONTRACTOR WHEN DEALING WITH THE TYPE OF WORKS DETAILED ON THIS DRAWING.

RISK SCHEDULE

ITEM	DESCRIPTION OF RISK OF ACTION
⚠	Specific health and safety risks associated with these works are highlighted with the caution symbol adjacent to the item of risk. Please refer to risk schedule contained on individual drawings.
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DRAFT

rev	date	description	initials
P1	26/10/21	DRAFT ISSUE	MPD

Project
CSG, PLOT 6, AREA H&I, SEVERNSIDE

Client / Architect
Cleansing Service Group

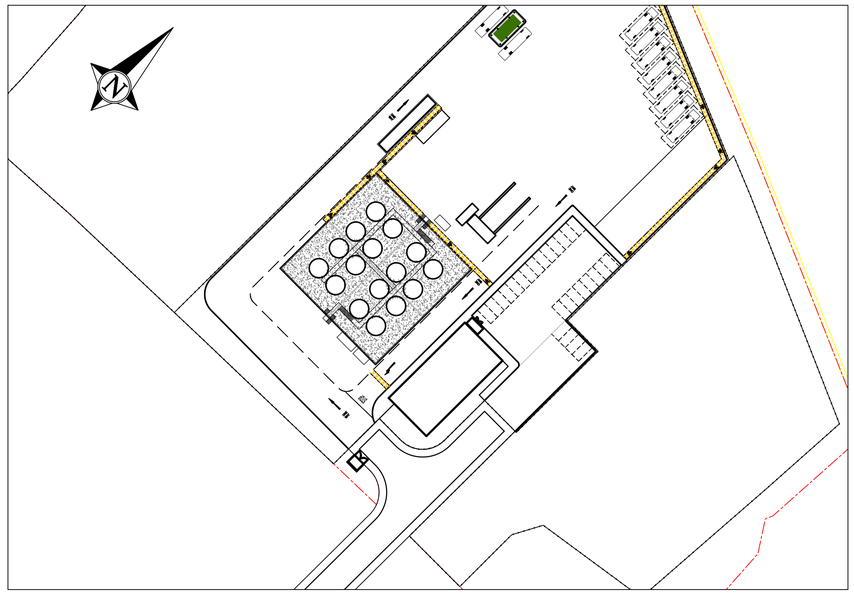
Title
LEVELS LAYOUT

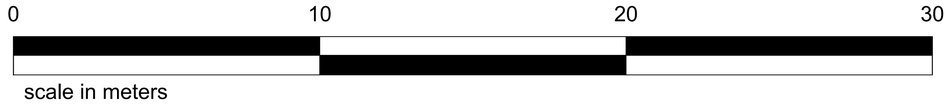
REUBY & STAGG LTD.
CONSULTING CIVIL & STRUCTURAL ENGINEERS

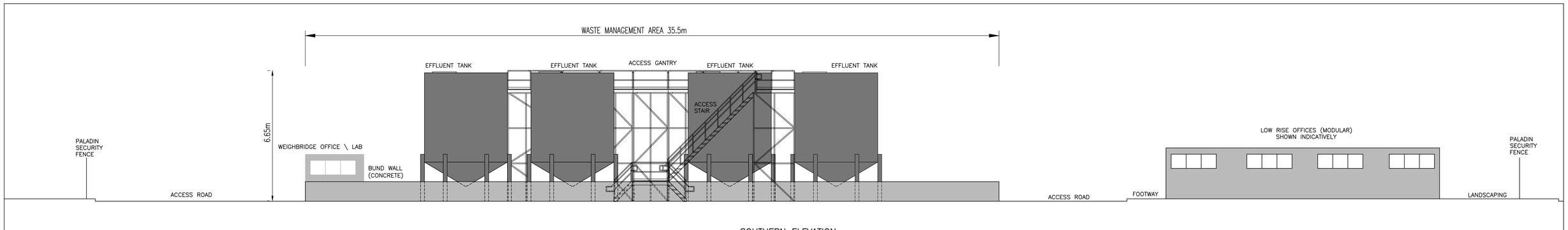
Hampshire Office:
Dewey House, 55 High Street,
Ringwood, Hampshire BH24 1AE
Telephone: 01425 484400
Facsimile: 01425 484409
Email: admin@reuby-stagg.co.uk

date	scale	size	project no.	drawing no.	revision
OCT 21	1:250	A1	10599	305	P1

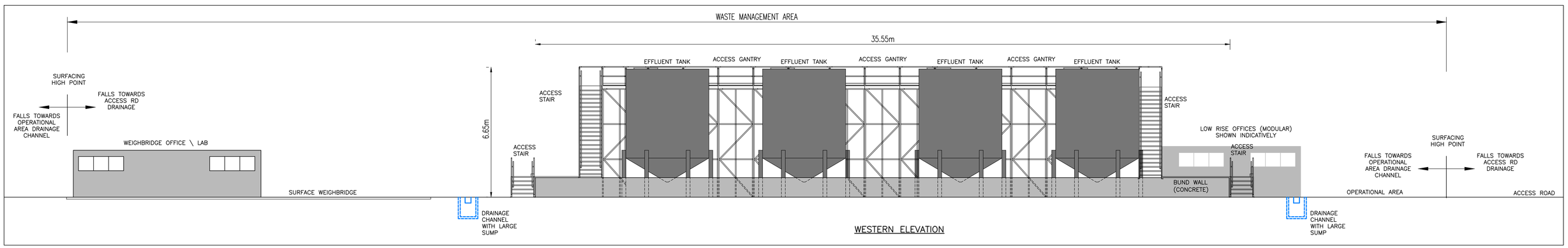
drawn DC
checked MD







SOUTHERN ELEVATION



WESTERN ELEVATION

PRELIMINARY

NOTES

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rev	date	description	initials
P3	05/11/21	DIMS ADDED, SCALE BAR ADDED, BACKGROUND DETAIL ADDED	MPD
P2	19/10/21	REVISED TO CLIENT COMMENTS	MPD
P1	14/10/21	DRAFT ISSUE	MPD

Project
CSG, PLOT 6, AREA H&I, SEVERNSIDE

Client / Architect
Cleansing Service Group

Title
SITE ELEVATIONS

REUBY & STAGG LTD.
CONSULTING CIVIL & STRUCTURAL ENGINEERS

Hampshire Office:
Dewey House, 55 High Street,
Ringwood, Hampshire BH24 1AE
Telephone: 01425 484400
Facsimile: 01425 484409
Email: admin@reuby-stagg.co.uk

date	OCT21	scale	size	project no.	drawing no.	revision
drawn	DC	1:500 PLAN 1:100 ELEV	A1	10599	210	P3
checked	MD					

APPENDIX 4

creating a better place

Environment Agency

Nicola Sugg
NSugg Limited
nicola@nsugg.co.uk

Our ref: 241610-WX
Your ref:
Date: 9 December 2021

Dear Nicola

Thank you for your enquiry which was received on 11 November 2021.

Abstract

Name	Product 4
Description	Detailed Flood Risk Assessment Map for **Severn Road, Avonmouth, BS10 7GD**
Information Warnings	*The mapping of features provided as a background in this product is © Ordnance Survey. It is provided to give context to this product. The Open Government Licence does not apply.*
Attribution	Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 2017 Ordnance Survey 100024198.

Flood Map for Planning
The Flood Map for Planning is now classed as Open Data. It can be downloaded free of charge under an open data licence from the following weblink:

https://data.gov.uk/publisher/environment-agency

If you search for the 'flood map for planning' in the search box the following datasets will be available for you select and download the data:

- Flood Map for Planning (Rivers and the Sea) – Flood Zones 2 and 3
- Flood Map for Planning (Rives and Sea) – Areas Benefiting from Defences
- Flood Map for Planning (Rivers and Sea) Flood Storage Areas
- Flood Map for Planning – Spatial Flood Defences (without Standard attributes)
- Recorded Flood Outlines
- Historic Flood Map
- Risk of Flooding from Surface Water Extent for:
  - → 3 percent annual chance
  - → 1 percent annual chance
  - → 0.1 percent annual chance

If you have requested this information to help inform a development proposal, then you should also note the detail in the attached advisory text on the use of Environment Agency Information and Further Guidance for FRAs.

Flooding history
We no longer produce pdf copies of the Historic Flood Map. This information is available to search select, and download free of charge as part of the Government's 'open data' as

- Recorded Flood Outlines
- the Historic Flood Map

These are GIS layers and can be download from: https://data.gov.uk/publisher/environment-agency

If you have requested this information to help inform a development proposal, then you should also note the detail in the attached advisory text on the use of Environment Agency Information and Further Guidance for FRAs.

ASEA Coastal Inundation model
South Gloucestershire Council, Bristol City Council and the Environment Agency are working together to improve flood defences and create new habitats for important wildlife species as part of the Avonmouth Severnside Enterprise Area (ASEA) Ecology Mitigation and Flood Defence Project. For further details about this project, including progress to date, please see the following link: https://www.asea-flood-ecology.co.uk/

Contractors BMMjv have been on site since summer 2019 and have commenced work at each sub section area and are programmed to complete of Area 1 (Old Passage down to southern end of Severn Beach) by autumn 2022.

As part of this project, a new coastal inundation model has been produced for the Avonmouth/Severnside area to represent the impact of the new flood defence.

This includes pre development (i.e. existing defences in place) and post development (representing the impact of the proposed defences) scenarios, for both present day and future dates (2076 and 2098) to be referred to in FRA's for commercial development. A scenario representing the breach of the proposed flood defences in 2098 has also been modelled. Please let us know if you wish to obtain a copy of the modelling report or model.

However, please note a future design scenario allowing for 100 years of Sea Level Rise (i.e. beyond 2098), which would be required to support 'More Vulnerable[1]' development proposals, has not been produced in this model.

The version of the model produced in 2020 simulating present day and future post development scenarios (representing the impact of the proposed defences) following the updated sea level rise guidance in accordance with UKCP18.

[1] As defined in Table 2 on the following webpage: https://www.gov.uk/guidance/flood-risk-and-coastal-change#flood-zone-and-flood-risk-tables

Customer & Engagement, Wessex
Rivers House, East Quay, Bridgwater, Somerset, TA6 4YS
Phone: 02030 250 376
Email: wessexenquiries@environment-agency.gov.uk
www.environment-agency.gov.uk

Due to changes in the flood defence design and a need to re-run breach scenarios in the Bristol City Council local authority boundary, we are only supplying post development 2098 depths and levels and post development 2098 breach scenarios as this is currently the best available data.

A further update of the ASEA model is planned for early 2022 with post-development scenarios representing the final detailed design of the flood defence scheme in the present day and future epochs (likely to be 2080, 2098 and 2120) and breach. The model will include the updated sea level rise guidance in accordance with UKCP18.

We understand that in due course the SFRA Level 2 will be updated by the Local Planning Authority but currently there are no timescales for this.

Flood Levels
From the ASEA model we have provided the flood level and depth for the post development 2098 and breach 2098 for your proposed site:

Post Development 2098 (new defences in place)

Post Development 2098 0.5% (1 in 200 year) AEP Depth	0.00m	Depth
Post Development 2098 0.1% (1 in 1000 year) AEP Depth	2.22m	Depth
Post Development 2098 0.5% (1 in 200 year) AEP Level	0.00mAOD	Level
Post Development 2098 0.1% (1 in 1000 year) AEP Level	7.77mAOD	Level

Post Development Breach of new defences 2098

Post Development 2098 0.5% (1 in 200 year) AEP Depth (Breach Composite)	0.00m	Depth

Strategic Flood Risk Assessment (SFRA)
When preparing your Flood Risk Assessment (FRA) to support the planning application, you should also refer to Bristol City Council's Level 1 and Level 2 SFRAs available to download via the following link: https://www.bristol.gov.uk/planning-and-building-regulations/planning-policy/planning-evidence

As outlined above we understand that in due course the SFRA Level 2 for Bristol will be updated by the Local Planning Authority but currently there are no timescales for this.

In particular you should refer to the Avonmouth/Severnside SFRA Level 2, which currently gives the best available flood risk information for planning purposes for 'More Vulnerable' development proposals. Figure 7.3a of this document defines the future (2110) situation, which should be the design scenario used for 'More Vulnerable' development proposals.

Planning
If you have questions regarding the planning nature of your enquiry, or require advice on floor levels, please contact our Sustainable Places team on NWX.SP@environment-agency.gov.uk. Please be aware that we now charge for planning advice when consulted on pre-application enquiries. This new approach provides advice to developers in two ways. Firstly there is the provision of 'free' advice available to everyone where we give a preliminary opinion on a proposed

development. This sets out the environmental constraints together with any issues this raises for us. Should you wish us to review in detail any of these issues then we can do this through a chargeable scheme aimed at recovering our costs.

Environmental Permit for Flood Risk Activities
In addition to any other permission(s) that you may have already obtained e.g. planning permission, you may need an environmental permit for flood risk activities (formerly known as Flood Defence Consent prior to 06 April 2016) if you want to do work:

- in, under, over or near a main river (including where the river is in a culvert)
- on or near a flood defence on a main river
- in the flood plain of a main river
- on or near a sea defence

For further information and to check whether a permit is required please visit: https://www.gov.uk/guidance/flood-risk-activities-environmental-permits.

For any further advice, please contact your local Environment Agency Office, at bridgwater.frap@environment-agency.gov.uk.

Further Information
We advise that you also contact the Flood Risk Management Team, on 01179 223206, or by email, flood.data@bristol.gov.uk, at Bristol City Council, City Hall, PO Box 3399, Bristol BS1 9NE. For an interactive webmap showing flood risk information in Bristol please visit http://maps.bristol.gov.uk/bfrm/ as they may be able to provide further advice with respect to localised flooding and drainage issues.

Further details about the Environment Agency information supplied can be found on our website: https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather

If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency Information for FRAs: https://www.gov.uk/planning-applications-assessing-flood-risk https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

We hope you find this information helpful and it is provided subject to the guidance below, which we strongly recommend you read.

Yours sincerely

Corinne Moyse

Customer & Engagement, Wessex
Rivers House, East Quay, Bridgwater, Somerset, TA6 4YS
Telephone number: 02030 250 376
Email: wessexenquiries@environment-agency.gov.uk

Enc: Use of Environment Agency Information for Flood Risk Assessments (below)
Defence Map
Defence Data

Use of Environment Agency Information for Flood Risk Assessments (FRAs)

Important
Use of Environment Agency data: you should note that

1. Information supplied by the Environment Agency may be used to assist in producing a Flood Risk Assessment (FRA) where one is required, but the use of Environment Agency information does not constitute such an assessment on its own.

2. As part of your data request, we have provided all of the modelled data we hold for your location. Please note that some of our modelled information may have been produced for purposes other than for flood zone generation. This may mean that some of the modelled data you have been provided with has a lower confidence level, and has not been used in producing our flood map, nor definitively reflects the predicted flood water level at the property/development site scale. To check the suitability of the use of this information in your FRA please contact your local Partnership & Strategic Overview (PSO) team.

3. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or surface water runoff. The information produced by the Local Planning Authority and the Lead Local Flood Authority (LLFA) may assist in assessing other sources of flood risk.

4. Where a planning application requires a FRA and this is not submitted or deficient, the Environment Agency may well raise an objection.

5. For more significant proposals in higher flood risk areas, we would be pleased to discuss details with you ahead of making any planning application, and you should also discuss the matter with your Local Planning Authority.

Pre-Planning Advice from the Environment Agency
If you have requested this information to help inform a development proposal, then we recommend that you undertake a formal pre-application enquiry using the form available from our website:

Pre-application Preliminary Opinion:
https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

Pre-application Charged Service:
https://www.gov.uk/government/publications/planning-advice-environment-agency-standard-terms-and-conditions

Depending on the enquiry we may also provide advice on other issues related to our responsibilities, including flooding, waste, land contamination, water quality, biodiversity, navigation, pollution, water resources, foul drainage or Environmental Impact Assessment.

Flood Risk Assessment (FRA) Guidance
You should refer to the Planning Practice Guidance of the National Planning Policy Framework (NPPF) and the Environment Agency's Flood Risk Standing Advice for information about Flood Risk Assessment (FRA) for new development in the different Flood Zones. These documents can be accessed via:

National Planning Policy Framework Planning Practice Guidance:
http://planningguidance.planningportal.gov.uk/

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Phone: 02030 250 376
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www.environment-agency.gov.uk

Environment Agency advice on FRAs:
https://www.gov.uk/flood-risk-assessment-for-planning-applications#when-to-follow-standing-advice

https://www.gov.uk/government/publications/planning-applications-assessing-flood-risk

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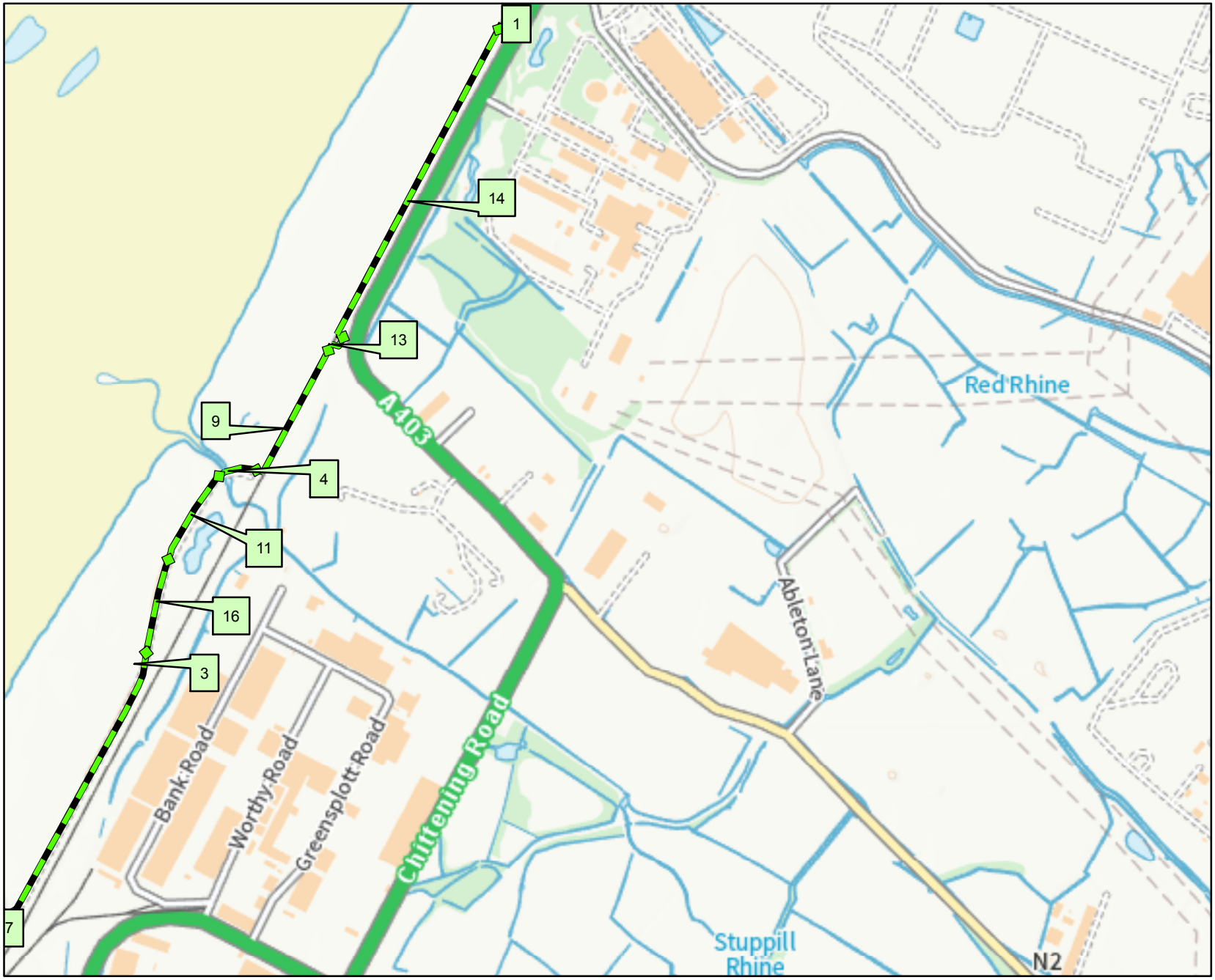
www.environment-agency.gov.uk

Current Flood Defences benefited on NGR ST5437981714 , created 19/11/2021 Ref: 241610-WX



Environment Agency

Scale: 1:10,000

N
W E
S

Legend

Defences

- bridge_abutment
- barrier_beach
- cliff
- demountable
- embankment
- flood_gate
- high_ground
- promenade
- quay
- wall
- beach
- dunes

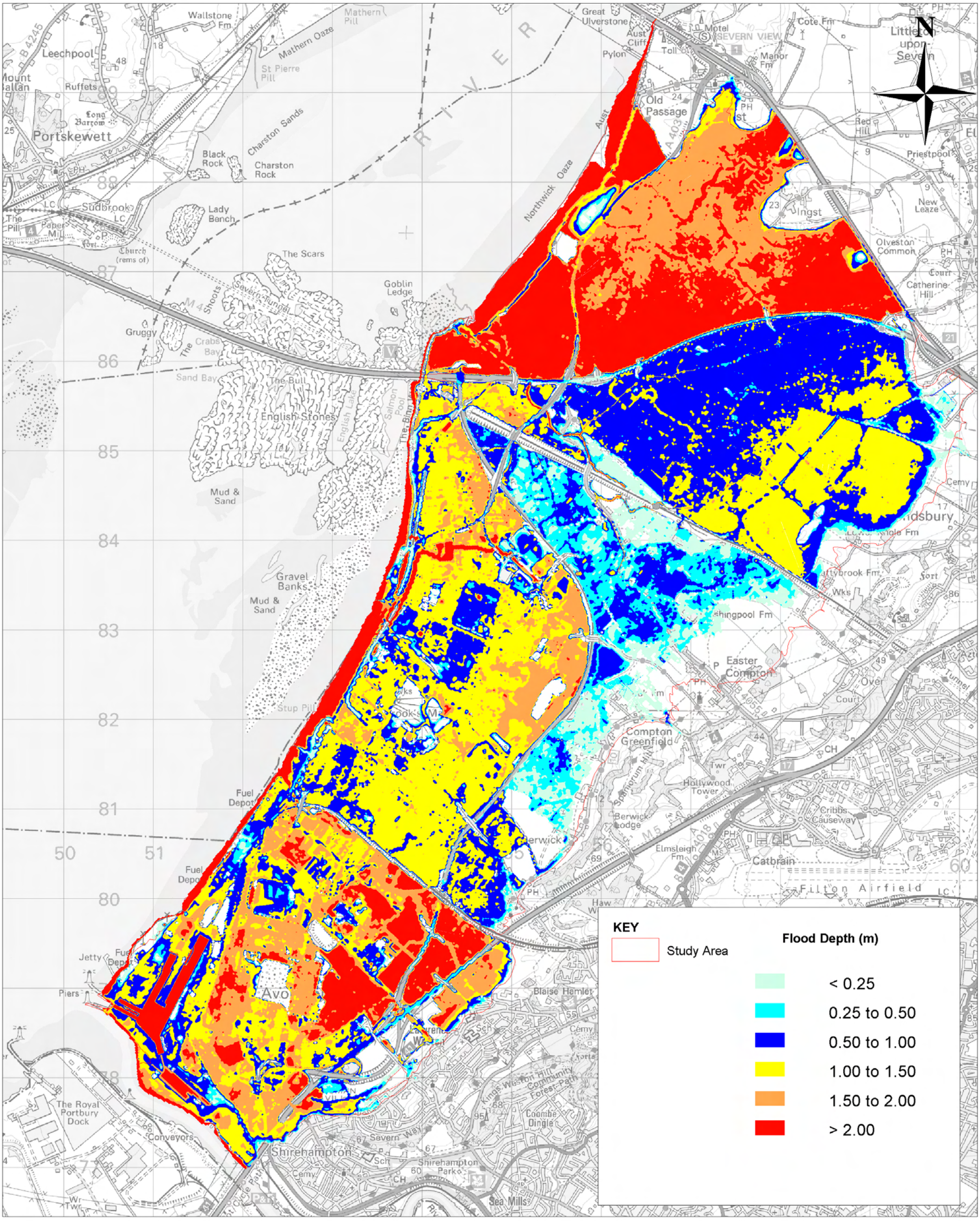
This data has been extracted from the Asset Information Management System (AIMS) which was created to draw various data sources into one database and has been populated with information of varying quality.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Product 4 - AIMS Information **241610-WX** **Date:** **19/11/2021**

Map Ref	Asset ID	Asset Type	Asset Description	Approx length (m)	Right or left bank	Actual fluvial downstream crest level (mAOD)	Actual fluvial downstream crest level accuracy	Actual fluvial upstream crest level (mAOD)	Actual fluvial upstream crest level accuracy	Actual fluvial coastal crest level (mAOD)	Actual fluvial coastal crest level accuracy	NGR	Most recent inspection	Overall condition
3	39397	embankment	Earth Embankment Defence incorporating Mitchells O/F	569.20	coastal	9.50	+/->75cm	9.50	+/->75cm	9.44	+/- 1 to 5cm	ST5273381581	22/11/2018	2
4	39398	embankment	Earth Embankment Defence	72.02	coastal	9.00	+/->75cm	9.00	+/->75cm	9.12	+/- 1 to 5cm	ST5296382020	18/02/2019	3
9	51387	embankment	Embankment Defence formed from rail embankment	260.76	coastal	9.06	+/->75cm	9.40	+/->75cm	9.49	+/->5 to 15cm	ST5310682244	18/02/2019	2
11	55699	embankment	Earth Embankment Defence	177.45	coastal	9.00	+/->75cm	9.00	+/->75cm	9.64	+/- 1 to 5cm	ST5285981947	22/11/2018	3
13	77118	embankment	Earth Embankment Defence, around rail opening	43.92	coastal	9.65	+/->75cm	9.65	+/->75cm	9.48	+/- 1 to 5cm	ST5312282248	18/02/2019	3
14	184339	embankment	Embankment Defence formed from rail embankment	635.19	coastal	9.44	+/->75cm	9.44	+/->75cm	9.49	+/->5 to 15cm	ST5341382824	18/02/2019	2
16	25168	embankment	Earth Embankment Defence	172.35	coastal	9.50	+/->75cm	9.50	+/->75cm	9.90	+/- 1 to 5cm	ST5280781842	22/11/2018	2

Notes
* Overall Condition has been taken from the most recent inspection
* Inspections are of a purely visual nature and do not necessarily reflect the true condition of the asset
* Condition 1 = very good, Condtion 2 = good, Condition 3 = fair, Condition 4 = poor, Condition 5 = very
DNR = data not recorded



Avonmouth/Severnside SFRA - September 2010

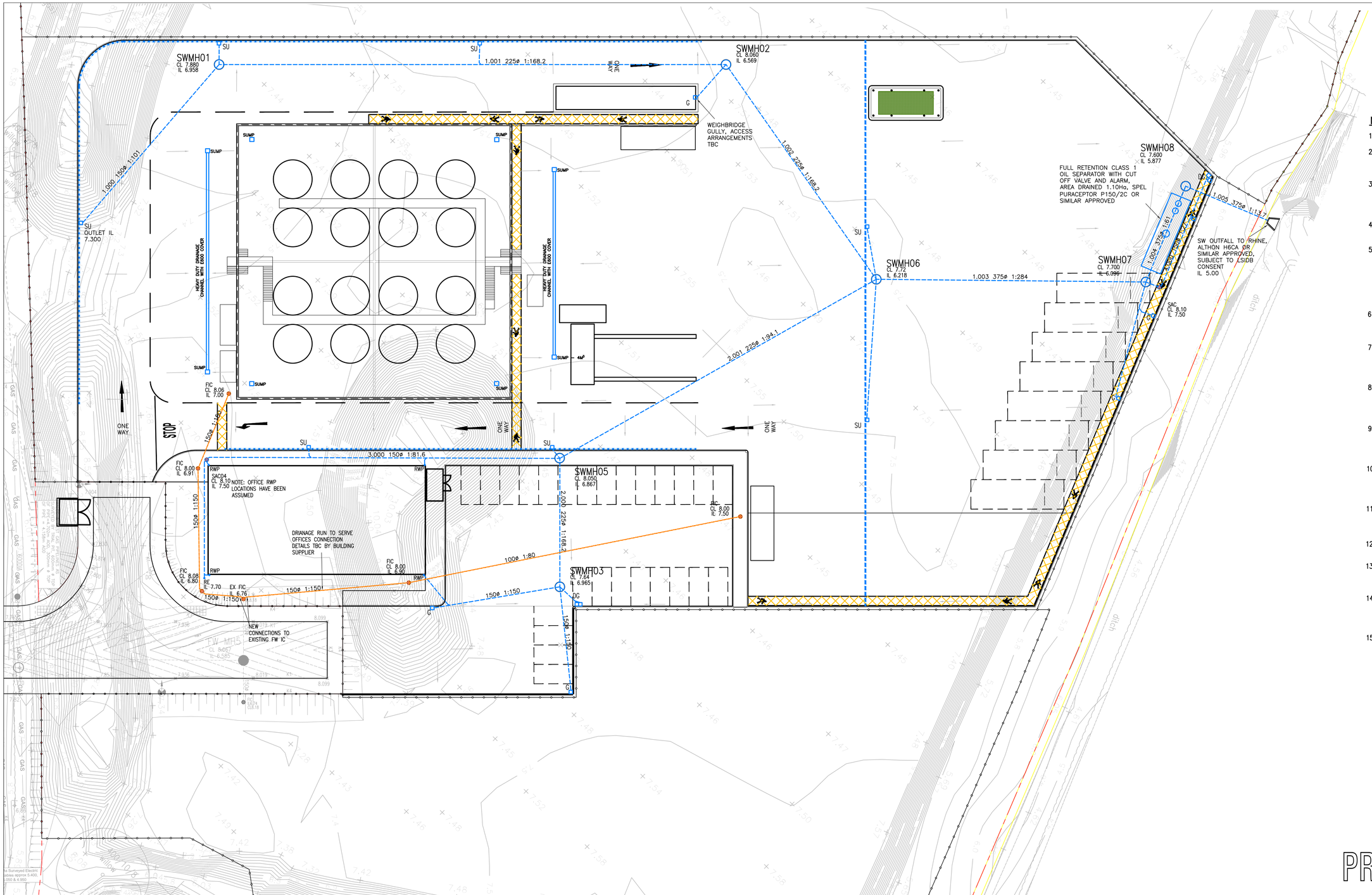
Actual Risk: Peak Flood Depths, Future Case
(Maximum Results From 2 Scenarios: S1 - 200 Year Tide, 2 Year Fluvial
S2 - 100 Year Fluvial, 2 Year Tide,
Figure 7.3

BRISTOL CITY COUNCIL
SOUTH GLOUCESTERSHIRE COUNCIL
LOWER SEVERN DRAINAGE BOARD

CAPITA SYMONDS

DRAWN BY	CHECKED BY	PASSED BY	DATE	SCALES @ A3	ISSUING OFFICE		DRAWING NUMBER	REV
BW	JT	CS	10/09/10	1:40000	BRISTOL	F:\ZENY\CS_JOBS\40000\CS043163_Avonmouth_Phase4\GIS\MapInfo\Workspaces\Report_fig_wor\CS043163_BRI115	CS043163_BRI0115	6

APPENDIX 5



NOTES

1. THIS DRAWING IS COPYRIGHT.
2. THE CONTRACTOR AND HIS SUBCONTRACTOR ARE TO VERIFY ALL DIMENSIONS ON SITE PRIOR TO MAKING SHOP DRAWINGS OR COMMENCING MANUFACTURE.
3. DO NOT SCALE THIS DRAWING. THE CONTRACTOR IS TO BRING TO THE NOTICE OF THE ENGINEER ANY DISCREPANCIES CONTAINED IN THIS DRAWING PRIOR TO WORK COMMENCEMENT.
4. ALL PIPE MATERIALS TO BE CONSISTENT BETWEEN MANHOLES.
5. ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION GUIDANCE FOR FOR FOUL AND SURFACE WATER SEWERS PUBLISHED BY WATER UK, CURRENT AT THE TIME OF CONSTRUCTION AND THE PARTICULAR REQUIREMENTS OF WESSEX WATER (TAKES PRECEDENT) AS AVAILABLE ON THEIR WEBSITE.
6. FOR CONSTRUCTION DETAILS OF MANHOLES AND SEWERS REFER TO THE DCG AND THE APPROVED DETAILS.
7. INVERT LEVELS OF EXISTING SEWERS TO BE CONFIRMED ON SITE BEFORE ANY SEWER WORK UNDERTAKEN. ANY DISCREPANCIES FOUND SHOULD BE NOTIFIED TO ENGINEERS.
8. WHERE SEWERS HAVE LESS THAN 1.2m OF COVER UNDER ROADS AND 0.9m COVER ELSEWHERE PIPES ARE TO HAVE CLASS Z BEDDING OR A 150mm PROTECTIVE CONCRETE SLAB ABOVE.
9. PLASTIC CHAMBERS AND RINGS SHALL COMPLY WITH BS EN 13598-1 AND BS EN 13598-2 OR HAVE EQUIVALENT INDEPENDENT APPROVAL, TO TABLE 11 OF APPROVED DOCUMENT H1 OF THE BUILDING REGULATIONS 2010.
10. ORIENTATION OF ALL ACCESS AND INSPECTION CHAMBERS TO BE IN ACCORDANCE WITH NHBC TECHNICAL GUIDANCE 5.3/01
11. WHERE DRAINAGE IS TAKEN THROUGH BUILDINGS CARE IS TO BE TAKEN THAT FOUNDATION LEVELS AND DRAINAGE RUNS DO NOT CLASH.
12. ALL ADOPTABLE MANHOLES TO HAVE A MINIMUM CLEAR OPENING OF 600mmx600mm AND GRADE D400 UNO.
13. ALL BELOW GROUND DRAINAGE TO BE 100mmø UNLESS OTHERWISE INDICATED WITH A MIN. GRADIENT AS FOLLOWS:-
14. S.W : 100mm Dia. 1:100
    S.W : 150mm Dia. 1:150
    F.W : 100mm Dia. 1:80
    F.W : 150mm Dia. 1:150
15. ALL ADOPTABLE DRAINAGE MATERIALS SHOULD COMPLY WITH THE REQUIREMENTS OF PART E CIVIL ENGINEERING SPECIFICATION INCLUDED WITH DCG.

PRELIMINARY

HEALTH & SAFETY:

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LEGEND

- S1 – PROPOSED SURFACE WATER MANHOLE
- ST02 – PROPOSED SURFACE WATER SILT TRAP
- F1 – PROPOSED FOUL WATER MANHOLE
- G – PROPOSED GULLY CONNECTED TO SURFACE WATER SYSTEM
- SIC – PROPOSED SURFACE WATER INSPECTION CHAMBER (450mm DIA)
- FIC – PROPOSED FOUL WATER INSPECTION CHAMBER (450mm DIA)
- – DENOTES BELOW GROUND SURFACE WATER DRAINAGE, 100ø @ 1 IN 100 UNO
- – DENOTES BELOW GROUND FOUL DRAINAGE 100ø AT 1 IN 80 UNO
- – HEAVY DUTY LINEAR DRAINAGE CHANNEL 300mm WIDE, SLOTTED E600 GRATING, ALTHON HD3000 OR SIMILAR
- – HEAVY DUTY LINEAR DRAINAGE CHANNEL 200mm WIDE, SLOTTED D400 GRATING, ALTHON HD2000 OR SIMILAR
- RWP – DENOTES VERTICAL RAIN WATER STACK TO GROUND
- SVP – DENOTES VERTICAL FOUL STACK TO GROUND

rev	date	description	initials
P2	05/11/21	WELFARE CABIN FW DRAIN ADDED, OPERATIONAL AREA IC MOVED	MPD
P1	29/10/21	DRAFT ISSUE	MPD

Project: CSG, PLOT 6, AREA H&I, SEVERNSIDE

Client / Architect: Cleansing Service Group

Title: DRAINAGE LAYOUT

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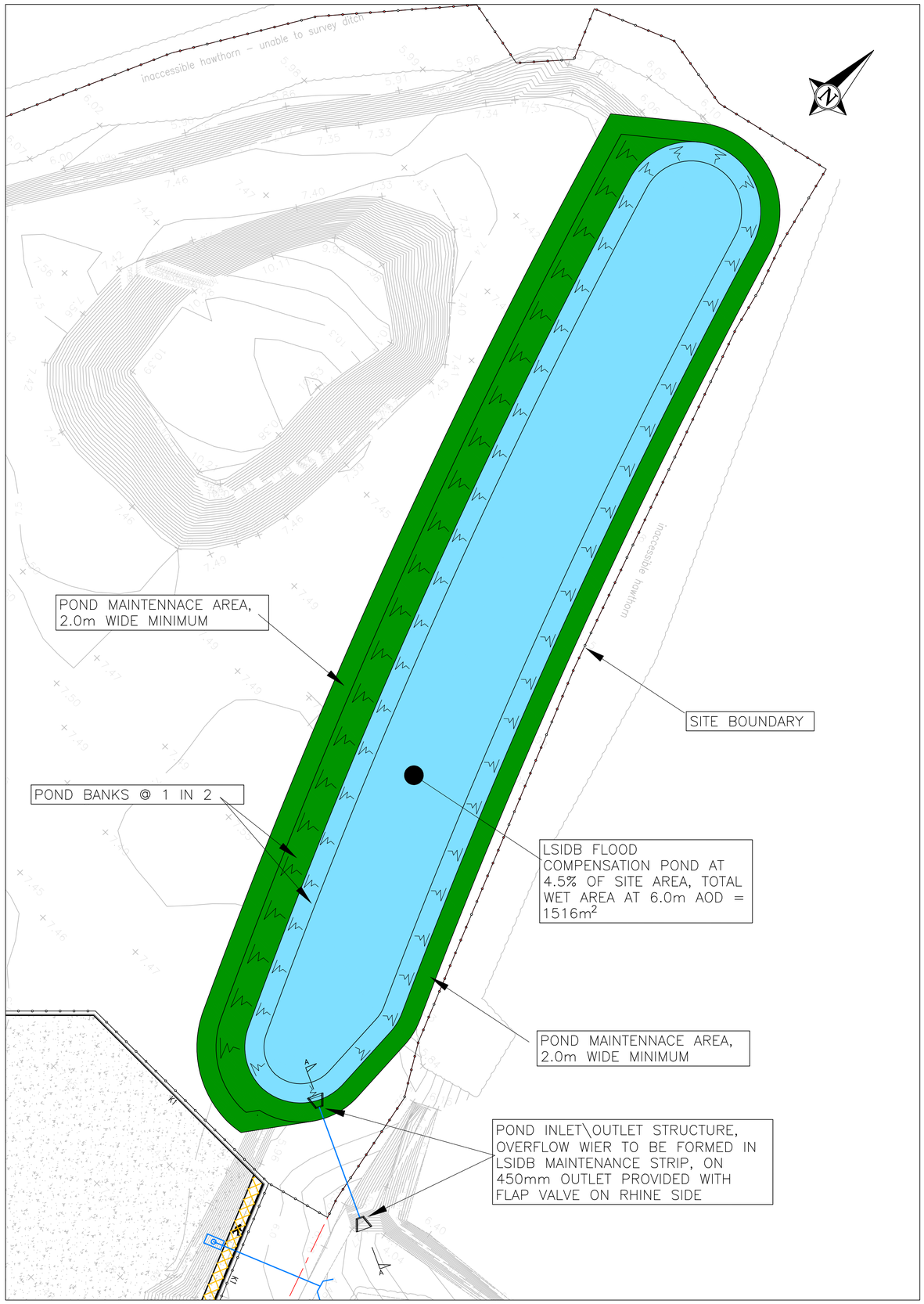
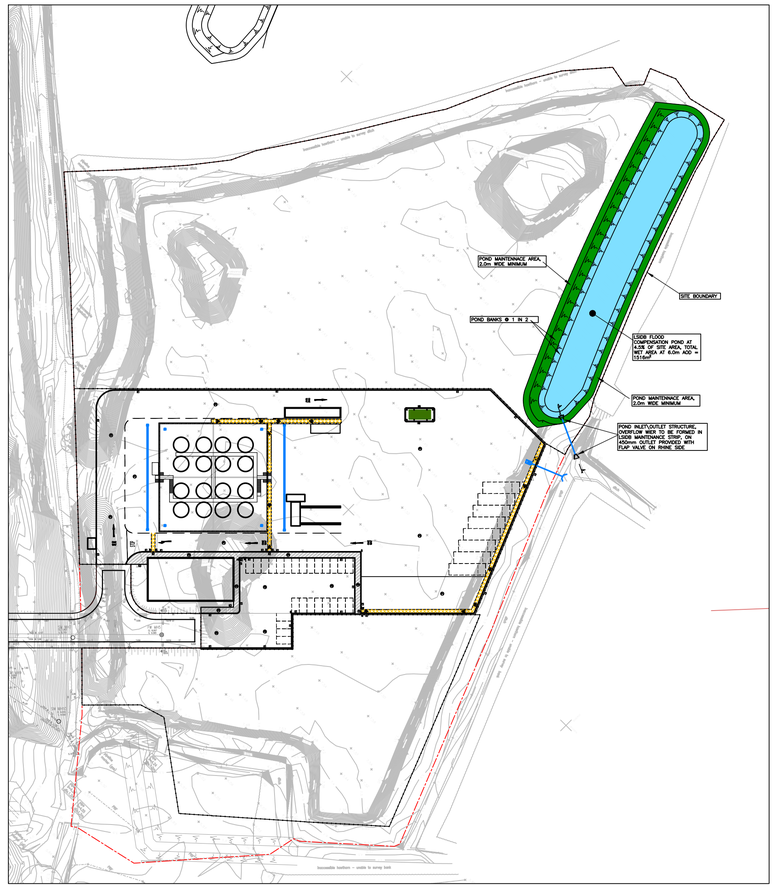
date	scale	size	project no.	drawing no.	revision
OCT 21	1:250	A1	10599	250	P2

drawn DC
checked MD





NOTES

1. THIS DRAWING IS COPYRIGHT.

2. DO NOT SCALE THIS DRAWING.
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3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST SUB–CONTRACTORS DRAWINGS AND THE SPECIFICATION.

HEALTH & SAFETY:

ALL WORKS TO BE CARRIED OUT BY A CONTRACTOR COMPETENT TO UNDERTAKE THE CONSTRUCTION OF WORKS AS INDICATED ON THIS DRAWING. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE JOB SPECIFIC RISK ASSESSMENT. THE HAZARDS NOTED ARE IN ADDITION TO THE NORMAL HAZARDS AND RISKS FACED BY A COMPETENT CONTRACTOR WHEN DEALING WITH THE TYPE OF WORKS DETAILED ON THIS DRAWING.

RISK SCHEDULE

ITEM	DESCRIPTION OF RISK OF ACTION
⚠	Specific health and safety risks associated with these works are highlighted with the caution symbol adjacent to the item of risk. Please refer to risk schedule contained on individual drawings.
	Unless highlighted there are no specific health and safety risks associated with these works, as a direct result of our design, apart from the common issues associated with construction that will need to be assessed by a competent contractor prior to the undertaking of any works.

DRAFT

rev	date	description	initials
P1	25/10/21	DRAFT ISSUE	MPD

Project
CSG, PLOT 6, AREA H&I, SEVERNSIDE

Client / Architect
Cleansing Service Group

Title
LSIDB POND DETAILS

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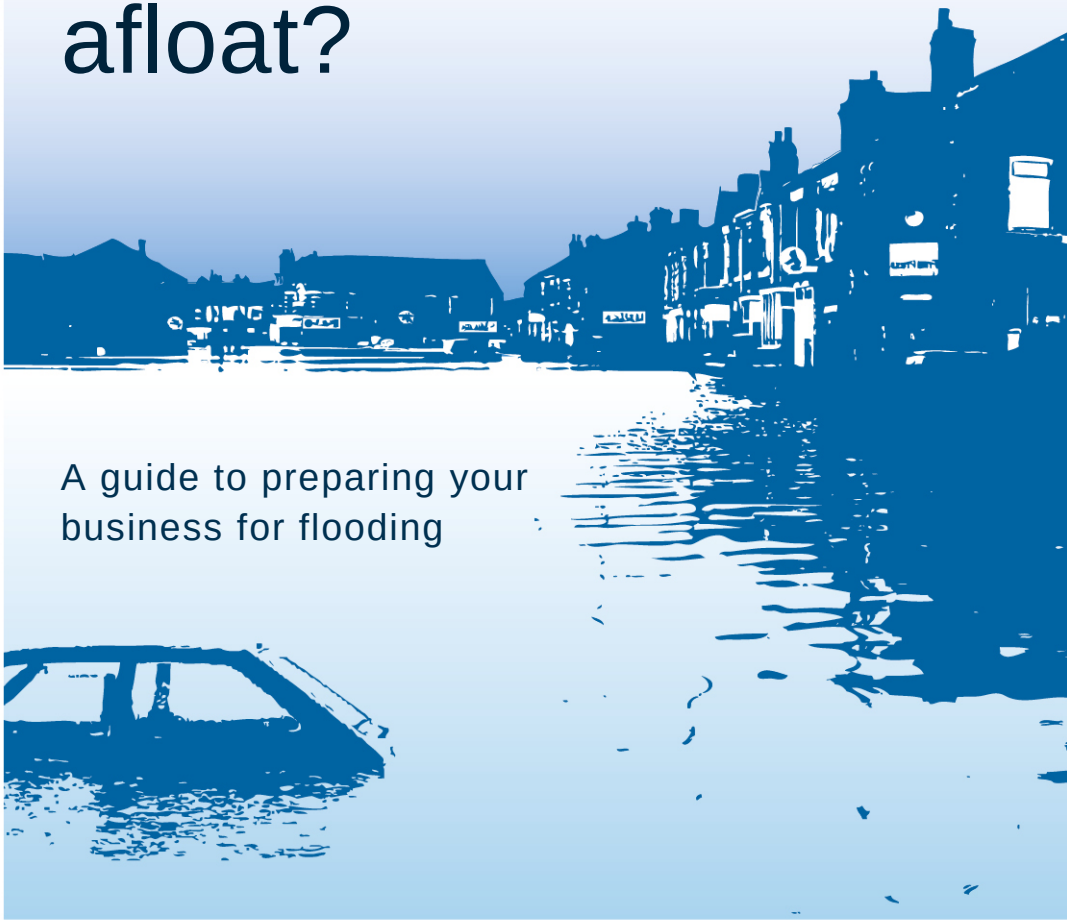
date	scale	size	project no.	drawing no.	revision
OCT 21	1:250	A1	10599	206	P4

drawn DC
checked MD

APPENDIX 6

Environment Agency

would your business stay afloat?



A guide to preparing your business for flooding

Flooding is the most common and widespread natural disaster in the UK. Since 1998 there has been at least one serious flood every year. Businesses like yours are more likely to be flooded than destroyed by fire. As our climate changes we can expect to see more extreme weather – and more floods.

We aim to reduce the likelihood of flooding by managing land, rivers, coastal systems and flood defences. While we do everything we can to reduce the chance of flooding, it is a natural process and can never be completely eliminated.

By taking action to prepare in advance for flooding, most businesses can save between 20 and 90 per cent on the cost of lost stock and movable equipment, as well as some of the trouble and stress that goes with such an event.

This is a simple guide to some of the easy actions that you can take to make sure that your business is as well prepared as possible.

It tells you about how to find out if your business is at risk, our flood warning service and what our flood warning codes mean. It also has a simple template to use to design a flood plan for your company.

For more information about flooding, visit our website at **www.gov.uk/flood** or call Floodline on **0345 988 1188**.

Make sure that your business is prepared for flooding.

How do I find out if my business is at risk from flooding?

There are two quick and easy ways for you to find out if you're at risk.

call us on
0345 988 1188

Our Floodline service is open 24 hours, calls are charged at local rate. By taking your postcode, our operators will check and see if your business is in a flood risk area.

Look at our website
www.gov.uk/flood

You need to be aware of flooding and keep an eye on the water levels and weather situation at all times. You can do this by checking the flood forecasts and the river and sea levels on our website.

Our online flood map uses the latest technology and data gathered over many years to give the most accurate view of flooding in your area.

By entering your postcode you can find out if your business is at risk. Areas at risk from flooding are shown in dark blue and areas at risk from extreme flooding in light blue.

My business is at risk from flooding. What should I do now?

Start preparing now. If the weather conditions are right, flooding can happen at any time.

Remember, floods can happen at any time and any day – make sure you provide a number that can be contacted at all times – even out of working hours.

Sign up for flood warnings.

The first thing you should do is find out if you can receive flood warnings. In areas of high flood risk, we offer a service called Floodline Warnings Direct. This is a free, 24 hour service that sends automated flood warnings by telephone, SMS text, email, fax or pager.

To find out if you can receive this service, call Floodline on 0345 988 1188.

If your business isn't in an area covered by our warnings you can still check the latest flood warnings in force on our website.

When the situation is serious, flood warnings will also be broadcast on local television and radio news.

What practical steps can I take to protect my business?

Now that you've checked your risk and found out about flood warnings, it's time to start thinking about preparing a flood plan specifically for your business.

Taking simple steps can go a long way to protecting your business from flooding. Preparing a flood plan could:

- Significantly reduce financial losses, damage to property and business interruption;
- Help compliance with regulatory requirements (for example, Occupier's Liability Act 1984);
- Reduce exposure to civil or criminal liability;
- Enhance your company's image and credibility with employees, customers, suppliers and the community;
- Help fulfil your moral responsibility to protect employees, the community and the environment;
- Help you to obtain insurance cover.

What is a flood plan?

Just as many businesses have health and safety policies and contingency plans for an emergency, they should also have flood plans.

A flood plan is a written document that outlines how your business will respond to a flood.

This might include a list of steps you will take in case of a flood and the order you will take them in. It could also include the purchase of flood products and insurance.

A written plan can make information **easy** to access during a flood, **easy** to communicate to staff, and **easy** to remember.

Small businesses should make sure there is a plan of action in case of flooding. As the business owner, this may be your responsibility.

If your business is **medium sized**, flood preparation might be the responsibility of a team of people from different areas of the business.

If your business decides to have a flood planning team, this could be led by the business owner or Managing Director.

The leader of the flood planning team will need to let staff know about the plan once it is finished.

All members of the team should also keep a copy of important flood contacts at home for easy access.

Key areas to consider in your flood plan are:

- human resources;
- maintenance/facilities;
- finance and purchasing.

Once you have completed your plan don't forget about it. Look at it regularly and make sure it is up to date and in the event of a flood **use it**.

business flood plan

A written flood plan is recommended for businesses.

It should include:

- A list of important contacts, including Floodline, building services, suppliers and evacuation contacts for staff;
- A description or map showing locations of key property, protective materials and service shut-off points;
- Basic strategies for protecting property, preventing business disruption and assisting recovery;
- Checklists of procedures that can be quickly accessed by staff during a flood.

If a flood is imminent, your main priority is to make sure that your staff are safe. However there may be other actions that you can take to prepare your building and it's contents to minimise damage and post-flood repair and restoration costs.

Business flood plan

Flood plan for _____ dated _____

Registered address _____

_____

Postcode _____

Staff contact list

Name	Address	Telephone/mobile	Emergency contact	Emergency telephone and address

Note staff who may require assistance in the event of a flood.

Name	Office location

Key locations

Service cut-off	Description of location
Electricity	
Gas	
Water	

Answer the following if applicable

	Description of location	How to protect from a flood (for example, move, cover, tie down)
First Aid Kit		
Oil based products (gasoline, oil, cooking oil etc.)		
Chemicals (including cleaning products)		

Protective actions

Identify stock, equipment and possessions that may need special protective measures, and describe the actions you will take to prevent damage in the event of a flood. We have suggested items and ways to protect them, but make sure you follow through on your plans.

think about:

- Computers;
- Tables / heavy furniture;
- Vehicles;
- Paper files;
- Electrical items;
- Chairs / stools;
- Databases;
- Soft furnishings;
- Computer files;
- Staff files.

ways to protect items

- Make a copy of important documentation and store in safe location;
- Raise items above ground level;
- Buy flood protection products;
- Buy new flood-resistant items;
- Move items to a safer location if possible – to an upper level of the building or off site.

Valuable item	Protective action	New location (if applicable)	Done
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐

Suggested basic building materials to help protect your property

If materials are not needed, leave the relevant section blank

Materials	Used for	Items to protect / where to use	Storage location	Done
Sand and sand bags (unfilled), shovel	Creating flood barriers (used with plastic sheeting)			☐
Tools – hammer, nails, saw	Boarding up doors, windows and openings, creating shelves			☐
Wood – plywood, blocks of wood	Boarding up doors, windows and openings, creating shelves			☐
Sturdy plastic sheeting	Sandbag barriers, pulling up around furniture and appliances			☐
Strong plastic bags	Putting around legs of tables and chairs			☐
Pallets	Raising stored stock above flood level			☐
Emergency power generator	Maintaining function of air conditioning units (can help dry out a building), running fridges and freezers, medical equipment if appropriate			☐

Identify people who can help you before, during and after a flood, and what they can do.

We have suggested ways they might be able to help, but you'll need to discuss this with them.

Name	Address	Telephone day	Telephone evening	Mobile

Ways people can help

- assistance with installing flood products;
- assistance with transporting stock/materials to new location if possible;
- provision of emergency storage;
- provision of emergency supplies or medical support if required.

discussion guide

This discussion guide sums up the key areas of flood planning. Some of this information can be found in this pack to help get you started.

Research

- Look at your existing business policies, and think about whether they are appropriate in the event of a flood.

Staff

- Make a list of **employees' contact details in the event of an evacuation**. This might include mobile telephone numbers, or numbers for their home or the home of a friend or relative;
- Think about staff who **may need special assistance** in the event of a flood (for example, elderly, deaf, blind etc.)

Security procedures

- **Locking windows, doors** and **setting the alarm**. You might need more than one person to help do this;
- Insurance policies – **Are you insured for flood damage**, business interruption and lost revenue?
- Employee manuals – You might **add flood safety to staff information packs**, or adapt job descriptions to include flood warden duties;
- Hazardous materials plan – You must ensure that **chemicals, oils** and other **substances in your possession are kept safe** and do not contaminate flood water;
- Health and safety assessment – Plan to **check the functioning of flood products and flood warning systems regularly**, just as you do for fire safety equipment.

Check codes and regulations that might apply to your business in the event of a flood. The following could provide guidance on the right actions to take:

- Occupational health and safety regulations;
- Environmental regulations.

Important contacts

Make a list of important telephone numbers, including contacts for gas, electricity, water and telephone providers.

Key locations

- **Know the location** of cut-off points for gas, electricity and water. Ideally, these should be marked on a map that is stored with your flood plan;
- Know the location of chemicals, oils or other materials that could be dangerous or contaminate flood water. These should be stored safe from floods and other damage.

Protective actions

- Note key stock, equipment and possessions that may need special protection from flood water;
- Consider things you may need during or after a flood (for example, sandbags, plastic sheeting, loudspeaker);
- See if it's **possible to move key operations**, such as shipping or customer services, to another building.

Suppliers and external links

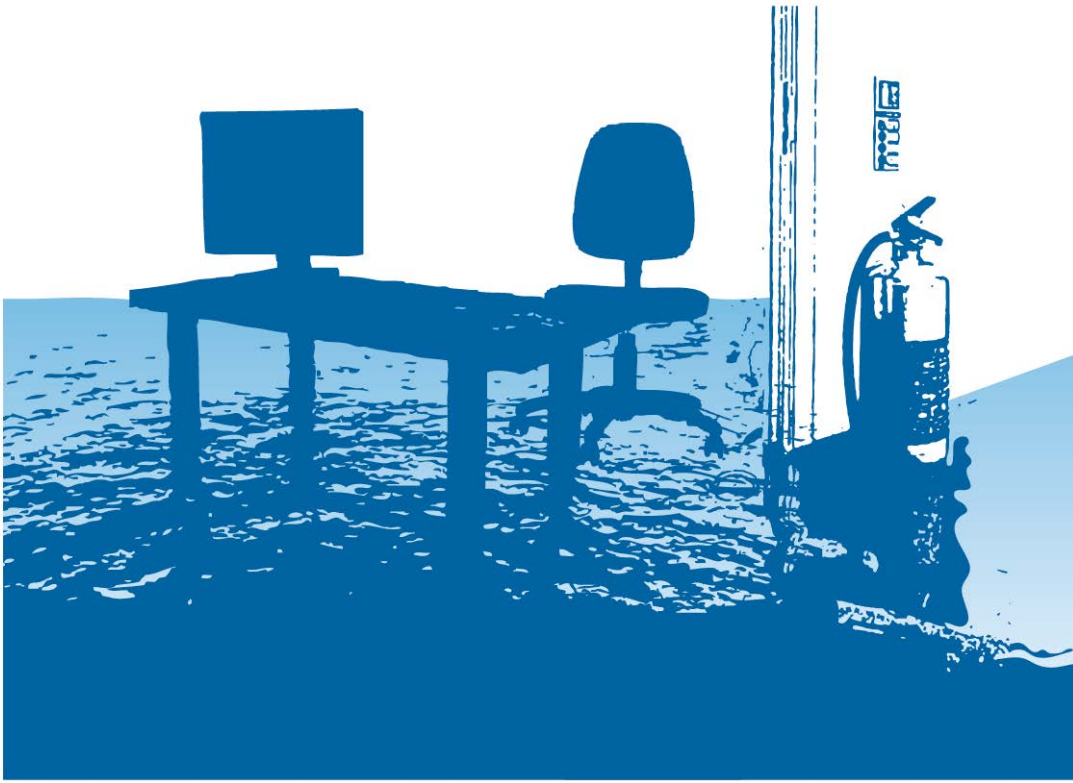
- Identify products and services you won't need in the event of a flood, or which suppliers may not be able to provide. **Make back-up plans** or arrangements for short-notice cancellation of deliveries;
- Consider contracting in advance with companies whose help you may need after a flood.

business checklist

Are you prepared for flooding?

If you answer no to any of the questions overleaf, there may be more you can do to protect your business.

The individual sections will give you valuable information on effective actions you can take to prepare for a flood.



If you can answer yes, please ☒, otherwise leave blank for no.

Know if you're at risk

- ☐ Do you know if you're at risk of flooding?
- ☐ Are flood warnings available in your area?
- ☐ Do you know how you can receive flood warnings?

Preparing a flood plan

- ☐ Do you know how your business will respond to a flood?
- ☐ Do you have a list of useful numbers including Floodline, local authority and insurance company?
- ☐ Do you know how to shut off your gas/electric/water supplies?
- ☐ Are your stock, fittings and valuable equipment stored above flood level?
- ☐ Have you developed flood contingency plans with suppliers and/or clients?
- ☐ Can you call someone to help you in the event of a flood?

Staff training and evacuation

- ☐ Are you aware of correct flood safety procedures for you and your staff?
- ☐ Have you trained your staff on flood safety procedures?
- ☐ Can your staff work quickly and efficiently to protect your business in the event of a flood?

Protecting your property

- ☐ Have you installed flood protection products?
- ☐ Do you have a stockpile of useful materials including plywood, plastic sheeting, sandbags (unfilled), sand, nails, hammer, shovel, blocks of wood and a saw?
- ☐ Have you installed non return valves in your toilets and drains?
- ☐ Do you and your staff have high ground where you can park your cars?
- ☐ Are your electrical sockets above flood level?
- ☐ Do you have computer equipment in the basement?

Flood insurance

- ☐ Do you have sufficient insurance cover in the event of a flood situation?
- ☐ Do you know what information your insurer will require to support a claim?

Evacuation

- ☐ Do you have an easy way to let your staff know about an evacuation?
- ☐ Do you know which roads will stay open in your area during a flood?
- ☐ Have you identified where staff can shelter in the event of a flood?
- ☐ Could you control staff panic during a flood?

understand your flood warning codes

Our warning service has three types of warnings - Flood Alert, Flood Warning and Severe Flood Warning - that will help you prepare for flooding and take necessary actions.

ONLINE FLOOD RISK FORECAST

What it means

Be aware.
Keep an eye on the weather situation.

When it's used

Forecasts of flooding on the Environment Agency website are updated a least once a day.

What to do

- Check weather conditions.
- Check for updated flood forecasts on our website.

FLOOD ALERT

What it means

Flooding is possible.
Be prepared.

When it's used

Two hours to two days in advance of flooding.

What to do

- Be prepared to act on your flood plan.
- Prepare a flood kit of essential items.
- Monitor local water levels and the flood forecast on our website.

FLOOD WARNING

What it means

Flooding is expected. Immediate action required.

When it's used

Half an hour to one day in advance of flooding.

What to do

- Move staff, stock and valuables to a safe place.
- Turn off gas, electricity and water supplies if safe to do so.
- Put flood protection equipment in place.

SEVERE FLOOD WARNING

What it means

Severe flooding. Danger to life.

When it's used

When flooding poses a significant risk to life.

What to do

- Stay in a safe place with means of escape.
- Be ready should you need to evacuate.
- Co-operate with the emergency services.
- Call 999 if you are in immediate danger.

WARNING NO LONGER IN FORCE

What it means

No further flooding is currently expected in you area.

When it's used

When river or sea conditions begin to return to normal.

What to do

- Be careful. Flood water may still be around for several days.
- If you've been flooded, ring your insurance company as soon as possible.

useful contacts

Fill in the contact details you may need if your business floods. Keep it in a safe place, where you can hold of it quickly.

	Company name	Telephone number/s
Environment Agency Floodline		0345 988 1188
Electricity supplier and meter number		
Gas supplier and meter number		
Water supplier and meter number		
Telephone provider		
Local authority emergency services		
Insurance company 24-hour number and policy number		
Insurance agent		
Local radio station for news alerts and weather updates		
Companies that may be able to help you after a flood		
Electrician		
Plumber		
Builder		
Equipment repair/suppliers		
Security services		
Water pumping services		
Emergency power suppliers		

Would you like to find out more about us, or about your environment?

Then call us on
08708 506 506* **(Mon-Fri 8-6)**

email
enquiries@environment-agency.gov.uk

or visit our website
www.gov.uk/environment-agency

incident hotline **0800 80 70 60** (24hrs)
floodline **0345 988 1188** (24hrs)

*** Weekday Daytime calls cost 8p plus up to 6p/min from BT Weekend Unlimited. Mobile and other providers' charges may vary.**

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