

Land at Port Talbot Steelworks: Outline Drainage Strategy

Revision B

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Contract

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This report describes work commissioned by Natalie Young, on behalf of Tata Steel UK Ltd, by an instruction dated 7th March 2024 Charlotte Lickman and Faye Tomalin of JBA Consulting carried out this work.

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1 Introduction

1.1 Terms of Reference

JBA Consulting were commissioned by Tata Steel UK Ltd to prepare an outline surface water drainage strategy. The outline strategy shall be used to support a planning application for the site and is to be submitted to the SuDS Approval Body (SAB) for pre-application consultation.

1.2 Site Description

The Land at Port Talbot Steelworks site is located south of Port Talbot, bound to the south-west by the Bristol Channel, and to the east by Margam and the M4. The Network Rail Swansea to London mainline generally forms the eastern boundary, with some small areas of Tata Steel owned land beyond this, as shown in Figure 1-1. The town of Port Talbot and Port Talbot Docks is located to the north of the site, with the southern boundary of the site encompassing Margam Moors. The steelworks is approximately 5.8KM from north to south and 1.9KM from east to west.

The majority of the site consists of developed areas used to support the current production of steel. These developed areas contain existing buildings and structures, hardstanding storage areas and infrastructure such as access roads and a rail corridor to the south-east.

To the south of the site is undeveloped open fields, which forms the northern part of the Margam Moors.

Table 1-1 below provides a summary of the key site details.

Table 1-1 Site summary

Site name	Tata Steel, Port Talbot
Site area	159.6 ha
Existing land use	Brownfield industrial and open space
Purpose of development	Steelworks
Local Planning Authority	Neath Port Talbot Council
Lead Local Flood Authority	Neath Port Talbot Council



Figure 1-1 Site Location

1.3 Proposed Development

Development proposals are as follows:

“Hybrid planning application: full planning permission for the demolition of existing buildings and structures, partial infill of the BOS lagoon, and construction of a new electric arc furnace-based steel production facility (1 no. arc furnace, 2 no. ladle furnaces). The development includes an upgraded slag processing facility, chemical/material storage and transfer infrastructure and pipework and cabling (above and below ground), buildings, fume and dust treatment plant, water treatment facility and material handling systems. Electrical control rooms and power infrastructure. Offices and ancillary facilities together with new and amended transport infrastructure, landscaping and green infrastructure, drainage and associated engineering operations.

Outline planning permission (with all matters reserved except for access and landscaping) for demolition and the construction of a scrap metal handling facility and associated scrap yards, scrap processing facility, underground and overground electrical infrastructure, and new and amended transport infrastructure, landscape and green infrastructure, drainage and associated engineering operations.”

Development proposal plans are contained in Appendix A.

1.4 Existing site topography

Natural Resources Wales (NRW) 1m LiDAR data has been used to illustrate the topography of the site, as shown in Figure 2-1. The lowest levels within the planning boundary are located in the south-east, where the reed network exists, at approximately 4.15mAOD. The eastern side of the site is generally lower than the west, with site levels typically remaining below 10mAOD. The site slopes in a general south-easterly direction.

The west of the site is shown to have typically higher ground levels, likely due to existing material and scrap storage areas. Levels in the south-west of the site are approximately 14.95mAOD, with the highest levels shown to be in the north-west of the site at around 23.06mAOD.

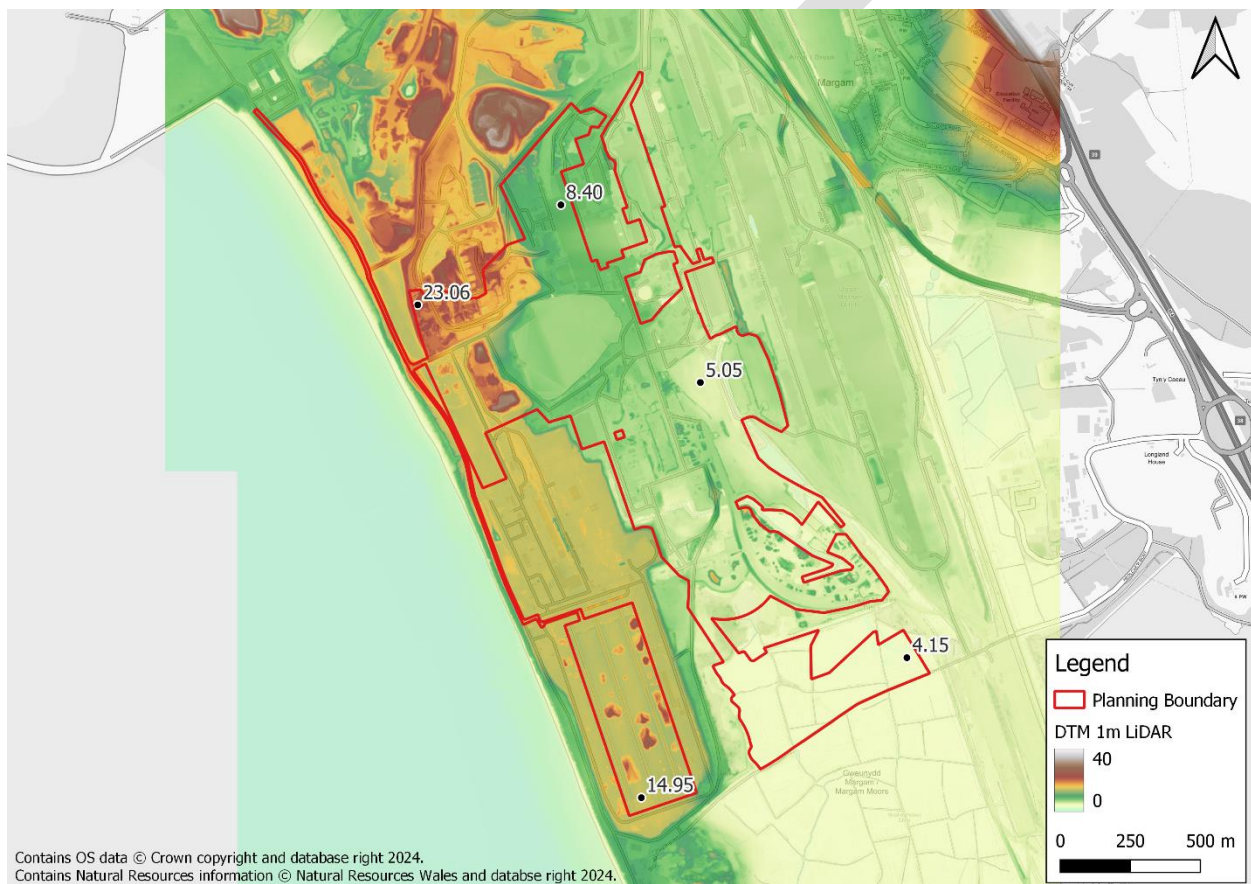


Figure 1-2 1m LiDAR DTM

1.5 Site geology and hydrogeology

The site's geology has been assessed using the British Geological Survey GeoIndex¹. The majority of the site's underlying bedrock geology is South Wales Middle Coal Measures Formation comprised of mudstone, siltstone and sandstone. Superficial geology at the site is comprised of Tidal Flat deposits made up of clay, silt and sand. However, due to the

¹ <https://mapapps2.bgs.ac.uk/geoindex/home.html>

site's current use, most of the site will in fact be made ground generated during the steel process, such as slag.

A Phase 1 Desktop Study, undertaken by RSKGeoScience, has been provided to support this study and is contained in Appendix C. The Desktop Study supports the above findings.

The soils have been assessed on the Cranfield University Soilscape² viewer and shown to be loamy and clayey soils of coastal flats with naturally high groundwater.

1.6 Summary of Surface Water Flood Risk

Surface water flooding occurs when rain falling on saturated grounds flow overland, following the local topography. Surface water flooding and subsequent overland flow can therefore pose a risk to both the development site and the surrounding land. The overland flow may originate from the site itself or adjoining land at a higher elevation from which flow migrates onto the development.

The NRW Flood Risk Assessment Wales (FRAW) flood risk from Surface Water and Small Watercourses mapping shows that the proposed development site is generally at very low risk, as shown in Figure 1-3.

The mapping indicates that there are some areas across the site with a low-high risk of surface water flooding. Low risk indicates between a 0.1% -1% AEP (1 in 1000 and 1 in 100) chance of flooding in any given year. High risk represents areas with a greater than 3.3% AEP (1 in 30) chance of flooding from these sources and is associated with the location of the BOS Lagoon.

It is likely that the FRAW mapping overestimates the level of surface water flood risk as the broadscale nature of surface water modelling of the FRAW product does not include the extensive detailed drainage network crossing the steelworks site. The existing network is detailed further in Section 2.1.

Surface water flood risk shall be managed through the use of SuDS, as detailed in this report.

² <https://www.landis.org.uk/soilscales/>

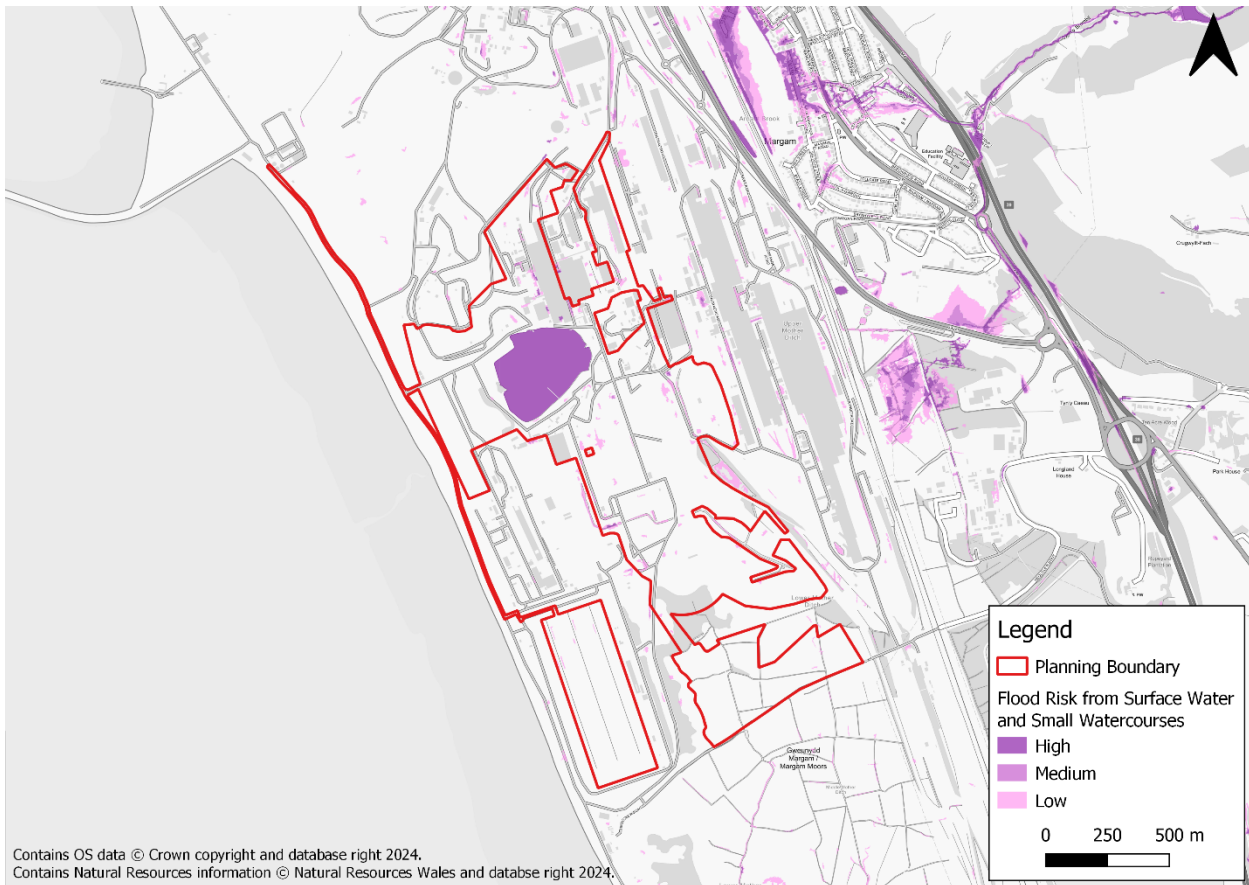


Figure 1-3 FRAW Surface Water and Small Watercourse flood risk

2 Existing Surface Water Drainage Regime

2.1 Existing Surface Water Regime and Nearby Watercourses

The development site has a complex existing drainage network, with several ordinary watercourses crossing the site, as shown in Figure 2-1, and Appendix B. Along with a number of watercourses, the Tata Steel site has an extensive piped drainage network to manage surface water runoff, foul drainage, and process water. These systems interact, as detailed in Figure 2-1.

To the south of the development site, Margam Moors drains in a northerly direction towards the Tata Steel site. The reed network of the moors drains to the south-easterly corner of the developable area, into the Lower Mother Ditch. The Lower Mother Ditch drains in a northerly direction, through a small lake, towards 'Point B'. Point B also receives flows from the Middle Mother Ditch via 'Point A'. Point B is a Tata Steel owned structure that culverts surface water towards the Abbey Pumphouse. The Abbey Pumphouse directs surface water to the short-sea outfall into the Bristol Channel. When water levels across the moors are high, water within the Lower Mother Ditch is pumped from Point B to the pumphouse. This manages flood risk across the moors.

Several small ditches flow along the site's eastern boundary and are culverted to the Lower Mother Ditch, south of the existing lake. A ditch also runs from the western extent of the development, in an easterly direction to the Lower Mother Ditch. This ditch only receives flows from the site, including land drainage and groundwater from the Coke Ovens area, which is elevated some 7m above local ground levels. The ditch is partially culverted along its route to the Lower Mother Ditch.

The Arnallt Drain intake is located to the north of the site and is an ordinary watercourse which is culverted through the site to the Abbey Pumphouse. The intake from the Arnallt Drain is used in the process system, before flowing to the short sea outfall.

The River Kenfig (an NRW Main River) is located approximately 1.85KM south of the proposed development site, as shown in Figure 2-2.

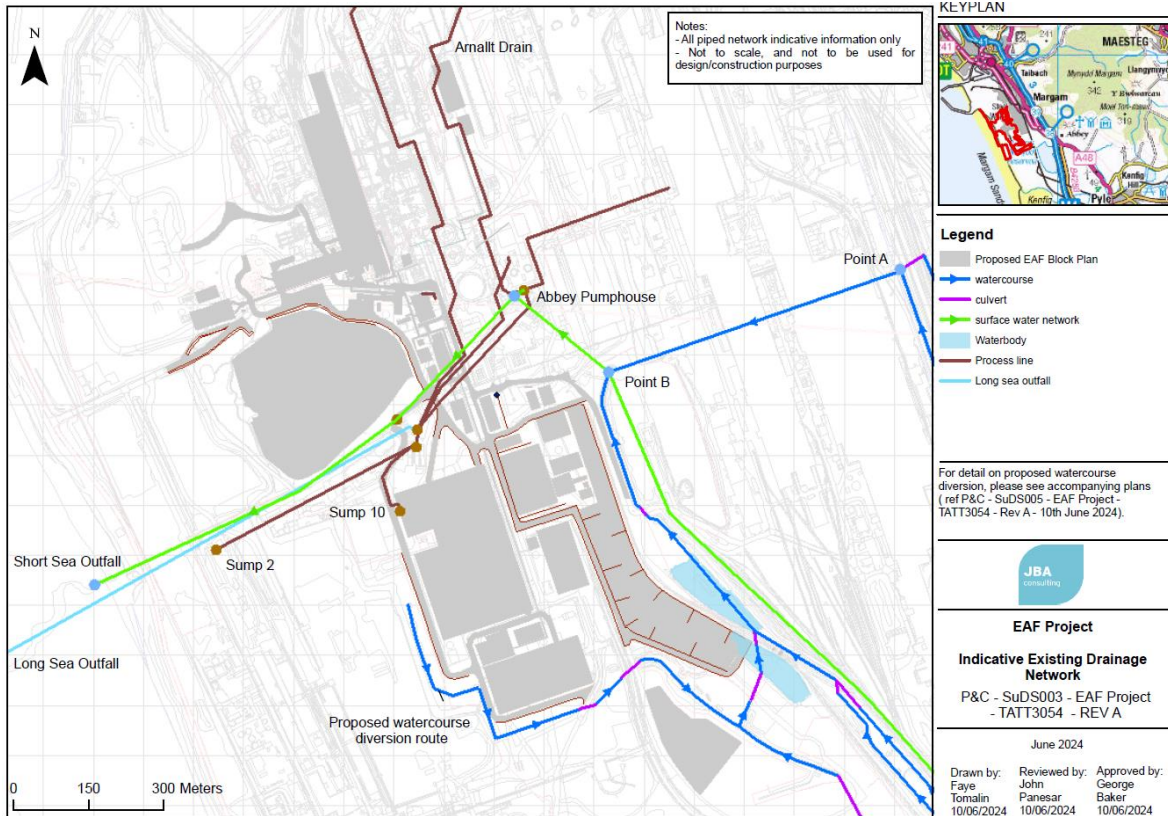


Figure 2-1 Existing Drainage Network

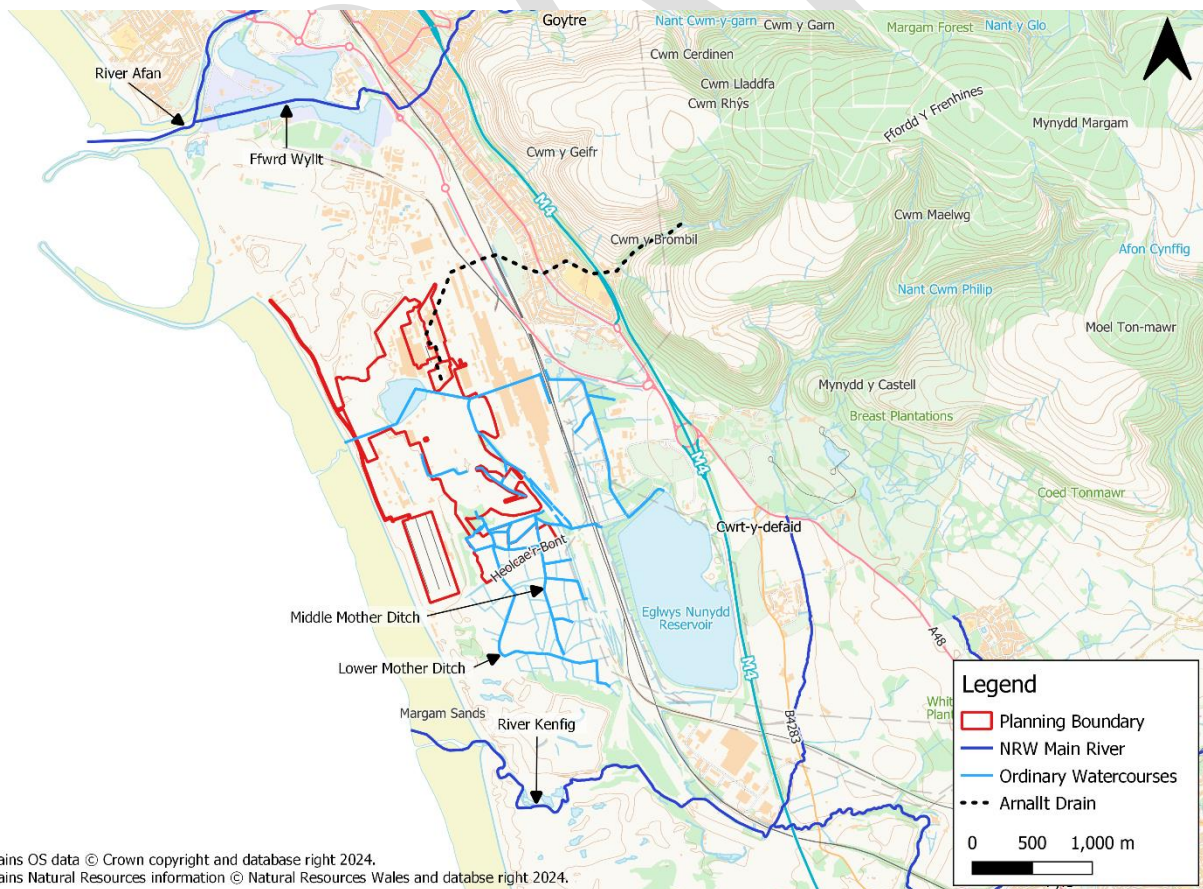


Figure 2-2 Nearby watercourses

2.2 Greenfield Runoff Rates

Table 24.1 of Ciria C753 The SuDS Manual indicates that the FEH methods (FEH Statistical and ReFH2) should be the preferred method for calculating peak Greenfield runoff rates. This is supported by the Natural Resources Wales GN008: Flood Estimation: Technical Guidance and Environment Agency research by Faulkner et al which concluded that the FEH methods are applicable across a range of catchment sizes and that they should be used in place of outdated methods such as IH124 and ADAS 345 where possible.

The UK SuDS Tool was used to calculate the Greenfield runoff rates for the site. Catchment descriptors for the local catchment (SAAR and BFIHOST) were extracted from the FEH Web Service. The calculated Greenfield runoff rates are shown in Table 2-1 below and the UK SuDS calculation record is included in Appendix D.

Table 2-1 Greenfield Runoff Rates

Return Period	Specific Runoff (l/s/ha)	Peak Runoff Rate (l/s)
QBAR	2.32	370.46
30	4.14	659.42
100	5.06	807.61

2.3 Greenfield Runoff Volumes

Runoff volumes for the proposed development site were also calculated for the six-hour storm event using the FSSR16 method as shown in Equation 1 below.

Equation 1:

$$\text{Runoff Volume} = \text{Site Area} \times \text{Rainfall Depth} \times \text{Percentage Runoff}$$

The rainfall depths for a six-hour 100-year storm event were extracted from the FEH Web Service and are summarised in Table 2-2 with the calculated Greenfield Runoff Volumes.

Table 2-2 Greenfield Runoff Volumes

Return Period	6-hour rainfall runoff depth (mm)	Site Runoff Volume (m ³)
30	46.8	18074
100	56.9	23328

3 Surface Water Management Approach

3.1 Surface Water Drainage Proposal

An outline surface water drainage proposal for the site has been developed which will manage surface water runoff without increasing flood risk to other developments or impacting on water quality downstream. The development of the drainage strategy is via a number of steps where the drainage objectives and options for SuDS features are determined. Further details design of the drainage system will be determined once an agreement in principle has been received from the SuDS Approval Body (SAB).

The outline strategy discusses each SuDS standard in turn and details the way in which the proposed surface water drainage strategy will comply with each standard.

3.2 Sustainable Drainage Systems

Sustainable Drainage Systems (SuDS) aim to mimic the natural processes of surface water drainage by allowing water to flow along natural flow routes ensuring that runoff rates and volumes during storm events are not increased above the Greenfield values. SuDS also aim to provide water treatment, biodiversity, and amenity benefits within Blue and Green corridors.

Schedule 3 of the Flood and Water Management Act 2010 was enacted in Wales in January 2019, leading to the requirements for all new developments to incorporate the four pillars of SuDS design, shown in Figure 3-1.

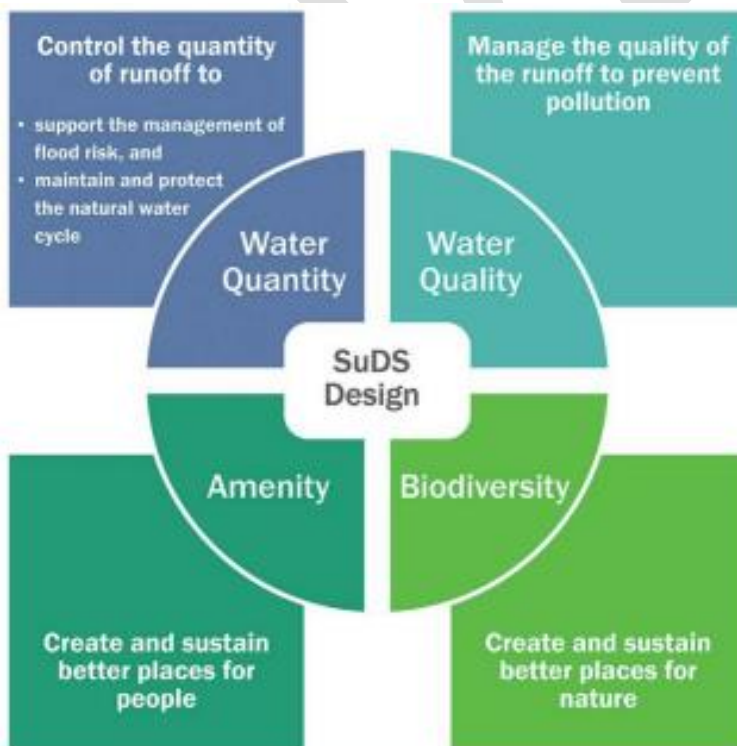


Figure 3-1 Four Pillars of SuDS Design (CIRIA 2015)

3.2.1 Design Criteria

A drainage strategy outlining the means of surface water management at the proposed development site has been produced in line with the latest guidance and design standards including:

- C753 "The SuDS Manual" (Ciria 2015)
- Statutory standards for sustainable drainage systems - designing, constructing, operating and maintaining surface water drainage systems (Welsh Government 2018)
- Rainfall Runoff Management for Developments - SC030219 (Environment Agency 2013)
- Planning Policy Wales (Edition 12, February 2024)
- The Building Regulations 2010: Part H: Drainage and Waste Disposal

In line with Sustainable Drainage Systems Standards for Wales (2018), surface water runoff events up to the 1% AEP (1 in 100) plus climate change return period event should be managed to protect people and property on and adjacent to the site from flooding from the drainage system.

Neath Port Talbot County Borough Council do not currently have specific local guidance for SuDS. Should guidance become available at detailed design stage, it should also be consulted to inform the drainage strategy.

3.3 SuDS Strategy Concept

The proposed development site is highly industrial, with the nature of the processes on site leading to a high potential for contamination in terms of water quality (Section 3.6). The development use / processes shall result in requirements to manage the potential for contamination prior to discharge of all surface water to its ultimate discharge location; The Bristol Channel.

Consequently, it is proposed to have two main surface water systems across the site: the Contaminated Stream and the Clean Water Stream. In areas of low pollution hazard, surface water shall be permitted to flow within the 'clean water stream' to the SuDS system and be discharged directly into designated on site surface water bodies where it is able. Across the 'contaminated stream', surface water shall be directed within a piped system to the on-site wastewater treatment works. Both streams shall be ultimately pumped to an outfall within the Bristol Channel.

The proposed development is to be incorporated into the existing Tata Steel works, with a number of existing buildings to be demolished as part of the proposals. Consequently, some areas of the development shall be undertaken on areas of existing impermeable surfacing. As a result, these areas shall not have drainage implications, and new facilities are proposed to be drained via the existing systems towards the onsite wastewater treatment works and ultimately pumped to the Bristol Channel. The proposed drainage areas are contained in Appendix F.

The Clean Water Stream shall be drained via above ground SuDS wherever possible, acknowledging the associated space constraints on site. SuDS features across the majority of the site shall comprise gravel substrate-based rain gardens and filter strips. However, SuDS features such as vegetated rain gardens and permeable paving shall be maximised at the location of the proposed office block and associated car parking. The proposed Outline Drainage Strategy is contained in Appendix F, with further details on how this strategy complies with the Statutory Standard for SuDS in Wales below.

3.4 S1: Surface Water Runoff Destination

The Statutory Standards for SuDS in Wales address the use of surface water by the development and where it should be discharged. It has developed a destination hierarchy which sets out the preferred routes for discharge of runoff from the site:

- Priority Level 1: Surface water runoff is collected for reuse
- Priority Level 2: Surface water runoff is infiltrated to ground
- Priority Level 3: Surface water runoff is discharged to a surface water body
- Priority Level 4: Surface water runoff is discharged to a surface water sewer, highway drain, or other drainage system
- Priority Level 5: Surface water runoff is discharged to the combined sewer

Priority Level 1 is the preferred (highest) priority and 4 and 5 should only be used in exceptional circumstances. The following outlines how the proposed development adheres to the drainage hierarchy.

3.4.1 Priority Level 1 - water for reuse

Across the Clean Water Stream, there will be opportunities for water re-use. Surface water from highways near and adjacent to the BOS lagoon shall discharge into this waterbody. The BOS lagoon abstracts water for the process systems across the steelworks site. Quantities of water abstraction from the BOS lagoon are currently unknown. However, it is envisaged that sufficient capacity shall be within the lagoon due to current system operations, and the existing monitoring arrangements to ensure that the BOS lagoon does not pose significant risk to the steelworks site. Should water levels within the lagoon be of concern, increased pumping can be undertaken to move water through the system, ultimately discharging to the Bristol Channel in line with the site discharge permits.

Other opportunities for surface water re-use from the Clean Water Stream shall be limited across the site. It is unlikely to be viable to re-use surface water from low pollution hazard highway across the outline application area of the site due to the nature of operations in this area (highways and storage facilities). Consequently, lower discharge priority levels are considered for drainage of these areas.

3.4.2 Priority Level 2 - infiltration

The Phase One Desktop Study of ground investigations is contained in Appendix C. The Phase One study indicates the potential for high groundwater levels, 1-2m below the

ground level. This limits the potential for infiltration based SuDS due to the required 1m depth between the base of a SuDS asset and the groundwater level. It also details potential contamination risk sources and mitigation measures across the site to minimise the risk of mobilisation of contaminants. These measures include minimising infiltration from the drainage system into areas of made ground across the site.

To date, no infiltration testing has been undertaken across the site. However, as a result of the above, it is considered that infiltration shall not be a viable solution for surface water discharge across the site. Given the risk of mobilisation of contaminants and the high groundwater levels across the site, the use of infiltration is not a suitable solution for surface water drainage across the steelworks. On the basis of the Phase One Desktop Study, it is assumed that no further information is required to support this conclusion for the site at detailed design stage.

Therefore, for the purpose of this report, it is assumed that infiltration is not viable.

3.4.3 Priority Level 3 - discharge to surface water body

There are a number of watercourses located across the steelworks site, as detailed in Section 2.1. The BOS lagoon is located within the northern extent of the site, adjacent to the position of the proposed EAF plant. As detailed in Section 3.4.1, the BOS lagoon is proposed to receive flows from the highways serving the EAF plant.

The southern extent (outline application area) of the site has a number of small watercourses, including the Lower Mother Ditch and an unnamed watercourse crossing the site, which drains to the Lower Mother ditch. As a result, it is proposed to discharge of surface water to these waterbodies where appropriate.

The Arnallt Drain flows in a piped system to the east of the proposed office and car park. It is therefore proposed to discharge of surface water from these areas via the 'clean water stream' to the Arnallt Drain.

All watercourses across the site ultimately flow into a pumped system and into the Bristol Channel.

Proposed site levels are currently in the process of being determined. However preliminary work using existing LiDAR and topographic survey suggests that a small area of the site shall not be able to drain to an on-site waterbody due to insufficient fall over the required distance for connection. Consequently, it is proposed to connect this area of the site to the Nautilus Building. This is the location of the main on-site wastewater treatment works. From this location surface water is pumped to the Bristol Channel.

It is therefore considered that the system flows into a tidal waterbody. Engagement with the SAB in April 2024 has provided an in principal acceptance to this discharge location.

As a suitable discharge location has been found, Priority Levels 4 and 5 have not been considered further.

3.5 S2: Surface Water Runoff Hydraulic Control: Proposed Discharge Rate

There are typically three design storm events which should be considered when designing the SuDS system for managing flows and volumes:

- 1 in 1 year event, on sloping sites without basements, where surcharging above soffits of any surface water drainage pipework is not permitted.
- 1 in 30 year storm event, where surface water flooding of the site does not occur at this frequency.
- 1 in 100 year storm event, with allowances for future climate change, where runoff from the site should be controlled to Greenfield rate using SuDS attenuation features to manage flows and volumes within the extents of the development site.

3.5.1 Discharge Limits and Attenuation Volume

In accordance with G2.1 of the Statutory Standards for SuDS in Wales *"where the surface water body is unaffected by either the discharge rate or volume of runoff (e.g. an estuary, the sea, or a waterbody identified in the Local Flood Risk Management Strategy (LFRMS) as not needing hydraulic control to runoff to it), the hydraulic management control requirements are limited to the drainage service provisions for the site and adjacent areas that could be affected by performance of the system"*.

As a result, there is no requirement to limit runoff from the proposed development as a consequence of discharging surface water directly into tidal waters (the Bristol Channel) or in order to mitigate fluvial flood risk, therefore reduction to greenfield runoff rates is not particularly relevant to this site.

Tata Steel UK Ltd require an additional permit for the extraction of flows from the Lower Mother Ditch. It is also noted, that on occasions of high fluvial flows within the system, the discharge limit has been exceeded by the site. Natural Resources Wales (NRW) are aware of these occasions and have raised no objections due to the related management of fluvial levels across the Moors and SSSI upstream of the Tata Steel land. Reference to these NRW comments is contained in Appendix E. The full NRW report is not currently available.

3.5.2 Interception of Rainfall

When rainfall takes place of greenfield sites there is, for the majority of rainfall events no runoff due to evapotranspiration or groundwater recharge. Therefore, interception mechanisms are based on runoff volume reduction using evapotranspiration and infiltration processes. Table G2.1 of the Statutory Standards for SuDS in Wales lists the interception drainage components which have assumed compliance.

Given that the proposed surface water drainage strategy intends to discharge of surface water to a tidally influenced waterbody, the need to comply with the requirements of interception is limited.

3.5.3 Exceedance Events

Extreme events exceeding the design event could occur and may result in overland flows across the site. The duration of flooding, max depth, max velocity and route of flood flows should be established and managed. Further details of these shall be provided at detailed design stage.

The impact of exceedance flows onto adjacent land should also be considered. However, there is no land downstream of the Tata Steel UK site and therefore potential impact on third parties is limited. Consideration shall also be given at detailed design stage to the pumping abilities of the site to increase the rate of flow through the system to minimise the impact of exceedance events.

3.5.4 Climate Change Impact

The Welsh Government has produced an Adapting to Climate Change guidance which contains updated representative climate change allowances for Wales for peak flows. The guidance contains indicative sensitivity ranges for peak rainfall intensity. As the proposed development site is non-residential, the assumed lifetime of development is 75 years, and as such the 2070-2115 estimate should be used. The recommended climate change factor for small catchments using the upper end estimate for the 2070-2115 epoch is 40%.

3.6 S3: Water Quality

To mitigate against adverse impacts on the water quality of the receiving water environment the CIRIA SUDS Manual recommends the following steps to determine the required water quality management for discharges to surface waters and groundwaters:

- Plan land use to prevent runoff and associated pollutants for most rainfall events up to 5mm in depth.
- Identify the pollution hazard level associated with the given type of development.
- Select risk assessment approach based on receiving water environment and the pollution hazard level.
- Carry out the risk assessment for each outfall considering the pollution hazard level, the status of the receiving water environment and effectiveness of the proposed SUDS techniques.

Table 4.3 of the SuDS Manual advocates the use of the 'simple index approach' to determine the appropriate level of pollution mitigation for development sites. This splits pollution into three contaminant types (Total Suspended Solids, Metals, and Hydrocarbons) and assigns a 'pollution hazard index' to each type. Different SuDS features are then assigned a 'SuDS Mitigation Index' and sufficient treatment is deemed to be provided if the 'SuDS Mitigation Index' is equal to or greater than the 'pollution hazard index' for each pollutant type. When more than one SuDS component is required a multiplication factor of 0.5 is applied to mitigation indices for secondary and tertiary components to account for reduced performance.

Whilst ordinarily the highest pollution hazard level would be considered for the entirety of a site, it is considered appropriate to manage surface water in line with catchments in

accordance with contaminant levels given the high pollution hazard for some areas of the site. Table 3-1 and drawing P&C - SuDS002 - EAF Project - TATT3054 - REV D - 10 September 2024 contained in Appendix G, outlines key areas of the site, along with the designated pollution hazard for each area and subsequent pollution hazard indices.

Table 3-1 Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Office Complex and associated infrastructure	Low	0.5	0.4	0.4
Highways	Low	0.5	0.4	0.4
National Grid Substation	Low	0.5	0.4	0.4
EAF Plant Highways	Medium	0.7	0.6	0.7
EAF Plant	High	0.8	0.8	0.9
EAF Plant stockpile route	High	0.8	0.8	0.9
Scrap Storage Yards	High	0.8	0.8	0.9

The SuDS Manual suggests that the Simple Index Approach should only be considered appropriate for use in consideration of mitigation for water quality when used as part of a detailed risk assessment. When dealing with High hazard sites, the environmental regulator should be consulted for pre-permitting advice to determine the most appropriate approach to the development of design solution. However, as the proposed development site is located within the wider Tata Steel ownership boundary, the site is already subject to the requirements of an existing discharge permit. The site is served via an existing wastewater treatment system which services process water across the site to sufficient levels to permit discharge to the Bristol Channel via the long sea outfall. It is therefore proposed to convey surface water from all High hazard areas of the site in a piped system towards the existing on-site wastewater treatment works. The use of a piped system minimises the risk of cross-contamination between drainage systems and the risk of contaminants entering the existing watercourse network around the site. Design levels need to be considered at detailed design.

All proposed buildings associated with the EAF plant are to be classified as high risk. This is due to the proximity of the Fume Extractor Plant, which is to emit, on average, 9kg/hr of dust particulate from the EAF. Further information on air quality compliance can be provided if required. Given the prominent wind direction across the steelworks site from west to east, all roofs of the EAF plant will be receptive of the dust particulate from the Fume Extractor Plant. Consequently, it is considered that this pollutant loading of surface water from roofs across the plant is high and not conducive with the water quality management that SuDS can provide. Given the need for gravel-based features to allow for robustness, suitability for the location and allowance for self-seeding vegetation requirements, the maintenance requirements as a result of the dust particulate matter are considered to be too great to allow for SuDS assets that would work to optimum capacity and functionality for the lifetime of the development. It is therefore proposed to drain the buildings associated with the EAF Plant to the 'contaminated stream'.

Scrap storage yards and loading areas across the southern extent of the site (outline application area) are also proposed to be high due to the risk of runoff from material high in TSS, oils and possible other contaminants. To mitigate the risk to water quality of surrounding waterbodies in this location, it is proposed to drain the scrap storage areas to the Contaminated Stream.

Areas of the site classified as Low and Medium Pollution Hazard areas are to be drained by above ground SuDS techniques wherever possible, with Medium Pollution Hazard areas drained via filter strips and gravel-based rain gardens in the form of a treatment train to mitigate the impact to water quality at source. Medium Hazard classification has been applied to the highways within the EAF Plant due to the nature of processes across these highways.

The office complex and associated infrastructure shall be classified as Low Pollution Hazard and will be drained using vegetated rain gardens and feature planting beds utilising boulders and ornamental grasses. Highways across the southern extent of the development, along with the National Grid Compound area are also to be classified as Low Pollution Hazard.

It should be noted, that as a result of the existing on-site systems, all surface water shall ultimately drain to the wastewater treatment works for proprietary treatment prior to being discharged to the Bristol Channel via the long sea outfall.

3.7 S4: Amenity Value & S5 Biodiversity

The design of the surface water management system should maximise amenity and biodiversity benefits across the site. SuDS components can enhance the provision of high-quality, attractive space which can help to provide health and well-being benefits, improve employee welfare and can contribute to improving the climate resilience of new developments. The ecological potential of a SuDS scheme can be maximised by utilising local planting and providing measures to enhance the existing ecosystem and/or work to mitigate against the impact of the development to its surroundings.

As detailed in Section 3.3, the proposed outline drainage strategy is formed of the 'clean water stream' and the 'contaminated stream'. The Contaminated Stream is comprised of a piped system conveying surface water directly to on-site wastewater treatment systems prior to being discharged to the Bristol Channel. Therefore, amenity and biodiversity benefits shall be obtained via the Clean Water Stream only.

The proposed SuDS scheme for the Clean Water stream will seek to utilise above ground SuDS as much as possible within the constrained space available across the site. The key opportunity for SuDS features within the layout of the site shall be at the location of the proposed office block and associated infrastructure. The inclusion of SuDS in this area will maximise the amenity benefits these assets can provide. This area has the potential for the inclusion of feature planting beds utilising boulders and ornamental grasses, and vegetated rain gardens to enhance the aesthetics of this area for all employees and visitors. Additionally, the use of permeable paving maximises the multifunctionality of the SuDS assets to provide a useable space whilst also providing a treatment function to surface water in this area. Care will need to be taken when considering any vegetated assets, working closely with the landscape architect and ecologists of the wider design team, to ensure that any planting is suitable for the asset provided, along with its location. Key constraints for vegetation shall be the potential for shade from adjacent buildings across the steelworks site.

The majority of proposed highways across the site drain to the Clean Water Stream. Proposals are for the inclusion of gravel-substrate based rain gardens along the highway to intercept and treat flows prior to discharge of surface water to the BOS lagoon, the unnamed watercourse or the Lower Mother Ditch. The rain gardens shall be planted with species sympathetic to the wider area, including pioneer vegetation on nutrient poor substrate akin to biodiversity which naturally occurs in the steelworks. Site-won substrates shall be used where possible (subject to the results of ground investigations), or alternatively shall be sourced from the wider steelworks area. The vegetation proposed is associated with industrial sites which can support key foodplants for invertebrates and provide sources of pollen and nectar. This habitat type is suitable for periodic disturbance, with low maintenance requirements.

Small areas of highway (Medium Pollution Hazard) are proposed to be drained via a filter strip, prior to surface water entering the gravel-substrate based rain gardens. This allows the additional treatment in the form of a treatment train to manage water quality prior to surface water entering the BOS lagoon.

Examples of filter strips and rain gardens likely to be used across the development are contained in Table 3-3.

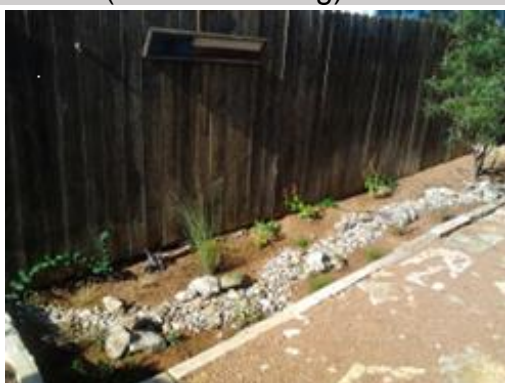
Table 3-2 Filter Strips and Rain Gardens



Roadside filter drain with self-seeded vegetation (JBA Consulting)



Self-seeded gravel-based rain garden



Rain gardens with buffer features to deter traffic



Filter strip providing treatment to road runoff prior to surface water entering filter drain (Susdrain image)

The current proposal for the outline strategy across the scrap storage area of the site is to discharge surface water to a small pond along the Lower Mother Ditch. Currently, this small pond area is overgrown and comprised of stagnant water, as shown in Figure 3-2. The re-introduction of surface water through the drainage strategy shall therefore enhance the biodiversity value of this pond through regular flushing of surface water within this system.



Figure 3-2 Pond on Lower Mother Ditch (January 2022)

Consideration has been given to the use of Green Roofs across the site to promote water re-use and for sustaining biodiverse systems, whilst managing rainfall at source. However, due to the proximity of the EAF plant to the Fume Extractor and the subsequent dust particulate matter that the roofs would be subject to, green roofs are unlikely to be viable in these locations. Further information on water quality, high hazard areas and the fume extractor plant is contained in Section 3.6. In addition, the setting of the EAF plant within the wider Tata Steel plant is to be considered. Consultation with the project ecologist has indicated that the proximity of the EAF plant to existing on-site structures is likely to result in shade and likely loss of plant life within the green roof, resulting in a loss of treatment potential and possible scouring of the surface (plus subsequent additional maintenance and loss of biodiversity benefits). Across the wider site area, namely across the outline application area, building structures are likely to have insufficient structural integrity to manage the additional structural loads from the application of Green Roofs.

Watercourse Diversion

As part of the proposals the unnamed watercourse to the southern extent of the site is to be diverted as a result of the requirement to place the National Grid Compound north of the southern fields. The existing watercourse is culverted along part of its length to facilitate highway crossings.

The proposed diversion route retains the watercourse as an open channel for as much as possible along its length. It is currently assumed that the existing highways in this area shall be removed. The proposed 'Clean Water Stream' shall discharge surface water to this unnamed watercourse at a number of discharge locations along its length.

General principles of the diversion are as follows:

- Retention of ditch profile to the existing channel
- Retain as open channel wherever possible
- Replacement 1.8m dia culvert to the eastern extent of the diversion to reconnect the existing watercourse

Further preliminary information on watercourse diversion proposals are contained in Appendix H. As detailed design of the site progresses, further information shall be available on the proposed ditch diversion. Prior to any works commencing, land drainage consent shall be sought from the Lead Local Flood Authority for the works.

Habitat Restoration and Enhancement

Along with the biodiversity benefits provided by the proposed SuDS scheme, further works are proposed across the steelworks site to promote and enhance the existing environment. Landscape proposals are contained in Appendix I.

Initial proposals for the restoration and enhancement of the Southern Fields were established by NPT in 2008. Tata Steel have committed to the implementation of this scheme. The restoration and enhancement scheme includes the creation of reedbed areas, a grazing regime to be introduced and the creation of wetland habitat by creating a series of bunds and scrapes to create semi-permanent wetland areas. Further information on these proposals is contained in Appendix I.

Further works are proposed to the BOS lagoon, concentrated on the western shore where simple interventions are proposed. This includes new marginal planting around the waters edge with opportunities for nesting islands within the planting; additional small pockets of scrub planting with the existing rough grass areas for additional shelter and, new tree planting (depending on soil conditions) to provide some vertical habitat and shelter for wildlife in this location.

3.8 S6: Design for Construction, Maintenance, and Structural Integrity

The national SuDS standards state that components must be designed to ensure structural integrity of the drainage system and any adjacent structures under anticipated loading conditions over the design life of the development, taking into account the requirement for reasonable levels of maintenance. The detailed design phase of the proposed drainage strategy will provide further information on the proposed maintenance of SuDS assets. The detailed design will include a maintenance plan and associated costs for the development site.

3.8.1 Health and Safety

Under the Construction (Design and Management) Regulations 2015 (CDM 2015) it is the designer's duty to:

- Eliminate foreseeable health and safety risks to anyone affected by the project.
- Take steps to reduce or control any risks that cannot be eliminated.

- Communicate, cooperate, and coordinate with the client, other designers and contractors involved in the project so that designs are compatible, and health and safety risks are accounted for during the project and beyond.

The potential significant hazards and risks associated with the construction, operation, and maintenance of the proposed surface water drainage system have been identified during the design process. The information on the identified hazards and potential mitigation measures of the risks presented by the hazards is summarised in the 'Designer's Risk Assessment' included in Appendix J.

It should be noted that the document identifies only significant hazards and risk within the immediate vicinity of the site based on a desk-based assessment of available information. The list therefore should not be considered as exhaustive, and a detailed site/survey should be undertaken prior to commencing any construction activities on site. A further detailed CDM risk assessment should be undertaken during the detailed design stage, when the development proposals are finalised.

3.8.2 Construction Surface Water Management

During construction of the proposed development surface water runoff shall need to be managed carefully to mitigate and minimise the risk of silt laden runoff (or other contaminants) entering the drainage system and ultimately, the dock. At this stage of the project, a Framework Construction Environmental Management Plan (FCEMP) has been prepared to outline the broad principles of how surface water shall be managed through the construction process. This is contained in Appendix K. A full Detailed Construction and Environmental Management Plan (DCEMP) shall be submitted with the full SAB application.

The following guidance documents should be referred to in the preparation of the CEMP.

- GPP1 Understanding your environmental responsibilities - good environment practices
- GPP2 Above ground oil storage
- GPP5 Works and maintenance in or near water
- GPP6 Working on construction and demolition sites
- GPP8 Safe storage and disposal of used oils
- GPP13 Vehicle washing and cleaning
- GPP 21 Pollution incident response planning
- GPP22 Dealing with spills
- Ciria C742 Environmental Good Practice on Site

Temporary Laydown Areas

Existing hardstanding areas across the site will be utilised as temporary laydown areas throughout the construction stage. The temporary laydown areas shall be utilised solely during the construction phase of the development and are indicatively shown in Appendix K.

It is anticipated that the temporary laydown areas will house the main principal contractor compound and associated amenities, including car parking, welfare facilities, material delivery, drop off and storage and potential pre-fabrication stations.

The majority of temporary laydown areas are comprised of areas of existing hardstanding. It is therefore envisaged that SAB approval shall not be required for the use of these areas, with no change in drainage arrangements proposed to these areas.

The exception to this is P Fields, a 2.7Ha area to the west of the Lower Mother Ditch. The development of P Fields to a concrete slab is subject to a separate planning application and SAB approval process. Pre-application advice is being sought separately from the SAB on the proposed drainage system for this area, with reference SP2024/0036.

Construction Phasing

Planning submission for the development is of hybrid nature, comprising full details for the proposed EAF plant, office and car park, with outline permission being sought for southern areas of the site, likely to comprise scrap processing yards and a National Grid sub-station. Consequently, a phased approach to construction is to be undertaken, which shall also determine SAB submission phasing. Whilst a whole site, holistic approach has been undertaken in the determination of the outline surface water drainage strategy, full SAB submissions shall be phased to allow for SAB considerations and approval to be gained as effectively as possible to enable on-site construction as soon as possible. The Indicative SAB Submission Programme is contained in Appendix L. It should be noted that the plan is indicative at this stage and for information only. Further detail shall be submitted with detailed design phase 1.

3.8.3 Adoption and Maintenance

Schedule 3 of the Flood and Water Management Act was implemented in Wales on the 7th January 2019. Under this legislation, SuDS that serve multiple properties must be approved and adopted by the SuDS Approval Body (SAB). As the Tata Steel site is possessed by a single landowner and uses a private network, the SuDS serving the site will not be adoptable and will be retained within the land ownership.

During the detailed design phase, a detailed maintenance plan shall be developed to demonstrate the maintenance required to ensure that the proposed drainage system functions to optimal capacity in perpetuity.

4 Conclusions

JBA Consulting were commissioned by Tata Steel UK Ltd to prepare an outline surface water drainage strategy. The outline drainage strategy shall be used to support a planning application for the site and is to be submitted to the SuDS Approval Body (SAB) for pre-application consultation.

The development includes “Hybrid planning application: full planning permission for the demolition of existing buildings and structures, partial infill of the BOS lagoon, and construction of a new electric arc furnace-based steel production facility (1 no. arc furnace, 2 no. ladle furnaces). The development includes an upgraded slag processing facility, chemical/material storage and transfer infrastructure and pipework and cabling (above and below ground), buildings, fume and dust treatment plant, water treatment facility and material handling systems. Electrical control rooms and power infrastructure. Offices and ancillary facilities together with new and amended transport infrastructure, landscaping and green infrastructure, drainage and associated engineering operations.

Outline planning permission (with all matters reserved except for access and landscaping) for demolition and the construction of a scrap metal handling facility and associated scrap yards, scrap processing facility, underground and overground electrical infrastructure, and new and amended transport infrastructure, landscape and green infrastructure, drainage and associated engineering operations.”

The proposed development site is a highly industrialised site due to its current production of steel. Consequently, due to the risk of water contamination across the site, the management of surface water shall need to reflect the industrial setting, along with meeting the requirements of the Statutory Standards for SuDS in Wales.

Consideration has been given to the potential of contamination of the existing surface water system. As such, surface water across the development site shall be managed through two streams: the Contaminated Stream and the Clean Water Stream.

The Contaminated Stream is comprised of a piped system conveying surface water directly to on-site wastewater treatment systems prior to being discharged into the Bristol Channel.

The Clean Water Stream SuDS system shall maximise the use of above ground SuDS where possible. This includes the use of filter strips, gravel -based rain gardens and permeable paving in areas such as the proposed office block and car parking, and along the highway, to intercept and treat flows prior to discharge of surface water to the BOS lagoon, the unnamed watercourse, or the Lower Mother Ditch.

Biodiversity and amenity benefits are maximised wherever possible across the site, particularly in the location of the proposed office block and car parking areas.

As the site shall retain in single ownership, long term management and maintenance shall be undertaken by Tata Steel UK Ltd, and the system shall not be offered for adoption by the SAB. A detailed management and maintenance plan shall be submitted at detailed design stage.

- A Proposed Development Plans**
- B Existing Drainage Network**
- C Ground Investigation**
- D Greenfield Runoff Rates**
- E NRW Abstraction Permit Comments**
- F Outline Drainage Strategy**
- G Water Quality**
- H Watercourse Diversion**
- I Landscape Proposals**
- J CDM Designers Risk Assessment**
- K Construction Surface Water Management**
- L Indicative Construction Phasing Plan**

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