Drainage Statement

Porthcawl Waterfront Regeneration

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Stantec Hydrock Ltd

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Appendices

1 Introduction

Stantec Hydrock Ltd have been commissioned by Welsh Government and Bridgend County Borough Council to undertake a preliminary civil engineering strategy design for the proposed drainage and civil engineering external works across the site of the future Porthcawl Waterfront Regeneration project.

This report provides information regarding previous consultations with relevant governing bodies to date, as well as outlining plans regarding future discussions to obtain necessary statutory approvals and consents. This report also outlines the standard Sustainable Drainage (SAB) procedure and details the national standards that all new surface water networks must adhere to in Wales as of January 2019.

Various constraints are detailed to provide context regarding any proposed diversions of existing drainage assets and design choices with regards to the new drainage systems and external levels.

The proposed foul and surface water drainage infrastructure within the entire redevelopment site has been outlined both in this report and in visual engineering drawings that are provided as appendices to this report.

2 Purpose of Report

The purpose of this report is to present the proposed, necessary and viable foul and surface water drainage strategy, for the eventual purposes of securing outline planning permission.

This report seeks to make clear the drainage requirements of the regeneration development, standards and consents that are required to be met, outline the existing arrangements from a foul and surface water drainage point of view and present a viable strategic solution for draining the proposed development area.

Prior discussions with relevant bodies such as BCBC Sustainable Drainage body (SAB) & Dŵr Cymru Welsh Water (DCWW) as well as individuals from the general local community are summarised to make clear any comments and concerns, as well as explain the next developmental stages that are to take place in the near future for the planning application.

Existing infrastructure and numerous engineering constraints are highlighted within the report and associated drawings in order to make clear any obstacles that the future development is to overcome as a minimum to be delivered successfully.

Key proposed infrastructure such as the proposed spine road running east/west through the development, drain/sewer diversions and new pumping stations are essential to unlocking the site and its various plots for future developers and therefore strategic phasing has also been considered.

This report is intended to supplement the civil engineering deliverables that accompany the PAC submission and the flood consequences assessment reporting by Stantec, which is a separate report to this drainage statement.

3 Summary

To accommodate the future regeneration works across the Porthcawl Waterfront site, a range of civil engineering, highway and drainage enabling and infrastructure works will be required to be completed. These will be carried out in multiple phases, at appropriate times that suit the overall development construction programme and future engagements with potential developers.

The existing site and engineering constraints relating to: existing levels, structures, drainage, flooding, highways and ground conditions have been investigated and considered during the formation of the engineering strategies to resolve them. Post-planning, these strategies will be further designed in detail, along with securing all linked consents, approvals and licences, ahead of construction.

Ground conditions vary across the site due to the different historic uses and activities on each plot, which presents challenges regarding building foundations, potential contaminated land and unsuitable earthworks materials. This has been considered and target solutions presented for each constraint due to the extent of significant earthworks required across the development masterplan area.

Prior consultations with DCWW (Dŵr Cymru Welsh Water) and BCBC (Bridgend County Borough Council) have taken place on several occasions to discuss the foul and surface water design strategies. A reliable on-site foul drainage strategy is proposed, that does not adversely affect the existing drainage network. An ongoing process has been agreed with DCWW on further studies to investigate and determine and design a suitable connection to the sewerage network that will not pose a risk to the local area, which may require off-site infrastructure upgrades. This process will extend beyond the planning application programme. A site-wide sustainable drainage system is proposed that will form the basis of a future phased consent from the SuDS Approving Body that will meet legislation requirements and limit flood risk.

Strategies for key new highway infrastructure and amendments to the existing highway are presented, to enable appropriate safe access to the new development areas and the new public realm and commercial areas.

Flood modelling and a flood consequences assessments have been completed to determine the effects of various sources of flood risk, including coastal on the proposed development and the necessary infrastructure required to mitigate this and protect the development from flood risk. This results in a scenario where the proposed development will be at a low risk of flooding.

4 Development Overview

The existing development site comprises primarily of brownfield land, which includes existing uses such as: Griffin Park, Coney Beach Pleasure Park, Monster Park, Hillsboro Car Park, Salt Lake Car Park and Sandy Bay open space.

The regeneration development proposal aims to transform the area into a mixed-use development featuring residential, commercial, and leisure spaces. The masterplan includes up to 980 new homes, approximately 20ha of open space (including a series of new significant public open spaces (POS) with different offers. In addition, 2.2ha is to be allocated for educational facilities, up to 130,000 square feet of commercial and leisure floorspace including retail uses, a hotel, lido and gym/ wellbeing centre.

The development will provide significant enhancements to the Porthcawl Harbour environment whilst ensuring risk of flooding is reduced as far as practically possible through the construction of new coastal defence works and new designated surface water drainage infrastructure.

Refer to Appendix J for the sitewide masterplan layout.

4.1 Phased development

Due to the size, commercial delivery and mixed-use nature of the proposed development, phased construction and delivery of the various facilities will be required. Initial development of key aspects of the site, such as the central spine road and associated linked infrastructure works, will be carried out first in order to provide access to other plots that are to be taken on by future developers thereafter.

Refer to Appendix K for landscape architect phasing plan.

4.2 Phased infrastructure

To ensure that aspects of the redevelopment can be constructed efficiently, it will be essential that certain key points of infrastructure across the site are addressed in a specific phased sequence ahead of further plot development. This is for infrastructure both directly serving the new development and also those independent but affected by it.

This includes the diversion and upsizing alterations of existing sewers, drains, utilities services, and highway assets, as well as the delivery of infrastructure serving the new development such as foul and surface water drainage, central spine road and flood defence revetment fronting Coney Beach.

Further infrastructure serving individual development plots can be addressed as and when each plot is developed in the future.

A phased infrastructure plan is to be included within the planning application.

5 Consultation Overview

5.1 BCBC & SAB

The developer and appointed engineering design consultants have engaged with the local authority's Sustainable Drainage Approval Body (SAB) team previously and have held meetings on two separate occasions to discuss the development, existing drainage systems, constraints and the proposed sustainable surface water design strategy that will serve the redevelopment.

Upon initial consultation, no immediate concerns or comments were provided by BCBC SAB and the scheme was met with general positivity however providing the requirements of the sustainable drainage legislation were met within the strategy. Other points raised are covered elsewhere in this report.

More detailed information will be provided in future SAB pre-app submissions will be required before further formal comment and decisions can be provided.

5.2 Dŵr Cymru Welsh Water

Important issues regarding the existing foul drainage network within the vicinity of the site have been raised and discussed with DCWW and it has been made clear by DCWW that the local sewer network is at full capacity and is currently prone to flooding and overflows, making it unsuitable for the proposed development to rely on fully or partially.

Therefore, to protect the existing infrastructure and provide a suitable and reliable network to serve the new development, an independent foul drainage system with no connections to nearby existing sewers is to be provided.

A single, safe discharge point into the wider sewer network is being identified in close conjunction with Dŵr Cymru Welsh Water through investigation, modelling & design

No development will be completed without a confirmed safe connection point and the completion of required upgrades, including treatment capacity.

Surface water will be managed separately via sustainable drainage, with no impact on the foul drainage system whatsoever.

Summary of discussions with Dŵr Cymru to date and anticipated milestones to achieve in due course:

Phase 1 – Initial Consultations and High Level Optioneering by DCWW

- DCWW Convened Teams meeting – Client and Operations kick off meeting to talk through requirements, limitations and concerns
- Sewerage digital hydraulic model availability and information gathering
- The undertaking of additional limited Modelling
- Site visit to review existing infrastructure and constraints
- Production of high-level solution options for the final sewer connection “off-site”
- Production of phase 2 works cost estimate and programme for completion

Summary of ongoing work to be completed by DCWW, which is expected to extend beyond the planning stage, but is not expected to create a route to objection that would prevent the outline planning process from moving forward.

Phase 2 – Detailed Feasibility and Optioneering

- Considerations for outline proposals
- Hydraulic Assessments
- Hydraulic Modelling if required
- Reporting as required
- Production of phase 3 works cost estimate and programme of deliverables aligned to the above

Phase 3 – Outline and Detail Design

- Developer team meeting to agree on proposals to take forward
- Production of phase 4 works cost estimate and programme of deliverables aligned to the above, to include any Ground Investigation works required for option agreed

Phase 4 – Construction – Construction of Designed Works to Enable Development Usage

During the pre-planning stage, it was agreed in principle that DCWW would not seek to uphold an objection to the development on sewerage capacity grounds, as there is an agreed process and plan in place to undertake the necessary investigation, design and construction of the major off-site foul drainage infrastructure to support the development, before new development requires an active foul connection. The same applies to the presence and proposed diversion of existing DCWW drainage within the development boundary.

5.3 Local Community

It is understood that the local community has concerns over the operation, capacity and maintenance of the existing public foul and surface water sewer drainage, flooding and pollution.

There is a general concern that the proposed re-development proposals may cause further flooding and sewer overflow issues.

This sensitive and important point has been taken onboard in the formation of the drainage strategy for the proposed development and a solution to the matter has been included in this report.

No reliance on the existing piped foul and combined sewer network around the immediate vicinity of the development area is being considered. The former fun fair site will be disconnected from the existing foul/combined sewerage infrastructure.

A network of new and independent foul sewers and pumping stations are proposed to serve the proposed development. There are no proposals for the development to connect to existing local sewers around the development area boundary; this is to avoid contributing to any existing operational and flooding issues within those sewers.

A suitable single point of discharge to the wider downstream sewerage infrastructure is being proposed by the development team and Dŵr Cymru Welsh Water, through a collaborative process that includes: investigation, hydraulic modelling and a detailed design process ahead of eventual construction. This is to ensure that a proven, safe and effective point of sewer connection is determined, that does not pose a risk to local sewer flooding in any part of the town and surroundings.

No development that requires a new foul drainage connection will be completed before a proven suitable and safe point of connection to a major point on the downstream sewer network is determined, including the proportional completion of identified essential reinforcement and upgrade works. This also includes consideration of the receiving wastewater treatment works capacity.

No surface water runoff (rainwater) will connect to the development's new foul drainage system. Any existing surface water currently reaching the foul/combined drainage system from within the development area will cease and be drained by a new sustainable drainage system that does not influence the foul drainage system at all.

Responsibility for the monitoring, operation, maintenance and improvement of the existing drainage networks that serve the existing developments is and will remain the responsibility of Dŵr Cymru Welsh Water and Bridgend Council, under their statutory responsibilities and associated legislation.

6 SAB Overview

6.1 Compliance with Standards

As the site is over 100m^2 and is considered to be a new development, the proposed surface water drainage will be subject to SAB (Sustainable Drainage Systems Approval Body) approval by the corresponding local authority (BCBC) and will therefore be designed in accordance with the statutory national standards for sustainable drainage systems outlined in Schedule 3 of the Flood & Water Management Act 2010.

The statutory standards set out basic principles that SuDS should meet, these include:

- Managing water on or as close to the surface and as close to the source of the runoff as possible;
- Treat rainfall as a valuable resource;
- Ensure pollution is prevented at source, rather than relying on the drainage system to treat or intercept it;
- Manage rainfall to help protect people from increased flood risk, and the environment from morphological and associated ecological damage resulting from changes in flow rates, patterns and sediment movement caused by the development;
- Take account of likely future pressures on flood risk, the environment and water resources such as climate change and urban creep;
- Use the SuDS Management Train, using drainage components in series across a site to achieve a robust surface water management system (rather than using a single “end of pipe” feature, such as a pond, to serve the whole development);
- Maximise the delivery of benefits for amenity and biodiversity;
- Seek to make the best use of available land through multifunctional usage of public spaces and the public realm;
- Perform safely, reliably and effectively over the design life of the development taking into account the need for reasonable levels of maintenance;
- Avoid the need for pumping where possible.
- Be affordable, taking into account both construction and long-term maintenance costs and the additional environmental and social benefits afforded by the system.

The statutory standards contain six technical standards that the SuDS system needs to conform with to be deemed acceptable by the SAB, these standards are:

- Standard S1 - Surface water runoff destination;
- Standard S2 - Surface water runoff hydraulic control;
- Standard S3 - Water quality;
- Standard S4 - Amenity;
- Standard S5 - Biodiversity;
- Standard S6 – Design of drainage for Construction, Operation and Maintenance and Structural Integrity

6.1.1 S1 – Surface Water Runoff Destination

This standard addresses the use of surface water by the development and where it should be discharged. The aim is to ensure that runoff is treated as a resource and managed in a way that minimises negative impact of the development on flood risk, the morphology and water quality of receiving waters and the associated ecology.

There are five priority levels for the destination of rainfall runoff, these are:

- Priority Level 1: Surface water runoff is collected for use;
- 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 another drainage system;
- Priority Level 5: Surface water runoff is discharged to a combined sewer.

6.1.2 S2 – Surface Water Runoff Hydraulic Control

This standard requires surface water to be managed to prevent as far as possible any discharge from the development for rainfall events of less than 5mm and that the surface water runoff rate and volume for up to a 1 in 100-year return period should be managed to protect people, properties and the receiving water body. Consideration is also required to the risk associated with runoff from events greater than 1 in 100-year return period with mitigating proposals developed for the scheme.

Interception will be maximised on site with the use of swales, bioretention areas, permeable paving and infiltration basins.

Based on the above information there is no need to consider discharging into a new or existing surface water system as the redevelopment seeks to use a combination of infiltration to ground and free discharge to the tidal harbour as discharge destinations.

6.1.3 S3 – Water Quality

Standard S3 addresses the drainage design requirements to minimise the potential pollution risk posed by the surface water runoff to the receiving water body.

The SuDS system will provide pollution prevention by means of a treatment train. The suitability of the pollution mitigation will be assessed via the simple index approach as referenced in the SuDS manual Ciria C753.

The simple index approach will show that all surface water will receive a sufficient amount of pollution mitigation.

6.1.4 S4 – Amenity

Standard S4 addresses the design of SuDS components to ensure that, where possible, they enhance the provision of high quality, attractive public space which can help provide health and wellbeing benefits.

The features in the form of bioretention areas, tree pits and swales have been provided, based on their natural form that mimics natural landscapes. These SuDS features will be planted according to the landscape architect's regime, likely with wildflower grasses and native shrub planting to the surrounding areas to create an attractive environment for building users / visitors, residents and members of the wider public. Seating areas will be provided in order to contribute to the health and wellbeing of pedestrians / residents and wider amenity benefits include improvements in air quality and carbon sequestration around the development through the planting of trees and shrubs in and around the SuDS features.

6.1.5 S5 – Biodiversity

Standard S5 addresses the design of SuDS to ensure, where possible, they create ecologically rich green corridors in developments and enrich biodiversity value by linking networks of habitats and ecosystems together.

The SuDS scheme biodiversity strategy should revolve around the creation of significant and varied habitat to increase the overall biodiversity of the site and ecological value. The inclusion of plant species that will enhance the general eco system and simultaneously act as a water filtration system to clean pollutants and contaminants should be used where possible.

The plant species selected should be both locally contextual and appropriate for the varied habitat zones including primary characteristics that shall ensure:

- Good soil binding and filtration species
- Minimised erosion
- Improved filtration via dense root and stem species
- Tolerance to seasonal variations including droughts and inundations
- Good level of suspended solids retention
- Pollutant tolerant
- Emergent and pioneering species for natural ecological colonisation
- The creation of diverse, self-sustaining and resilient ecosystems for high species biodiversity
- Support for local and regional habitat strategies

6.1.6 S6 – Design of Drainage for Construction and Maintenance

Standard S6 deals with designing robust surface water drainage systems so they can be easily and safely constructed, maintained and operated, taking account of the need to minimise negative impacts on the environment and natural resources.

The SuDS system will be designed to ensure that all elements can be constructed easily, safely, cost-effectively, in a timely manner and with the aim of minimising the use of scarce resources and energy.

The SuDS system will be designed to ensure the structural integrity of all elements and to ensure that operation and maintenance can be undertaken easily, safely, cost-effectively, in a timely manner.

All drainage will adhere to Sewers for Adoption 7th Edition, Ciria 753, Building Regulations etc where appropriate.

In accordance with CDM 2015 the design of the SuDS will take account of the health and safety risks and seek to minimise these were reasonably practicable. A SuDS risk assessment will form part of any future Pre-SAB applications.

An operation and maintenance schedule and plan will also need to be produced and submitted as part of any future Pre-SAB applications. This will enable owners, occupiers/operators etc. to easily understand the role that the SuDS system provides, expected observations during rainfall and operation and ongoing maintenance requirements of the system.

The SuDS design will ensure materials and components have a suitable design life and instances where rehabilitation of components will be required during the design of the development will be highlighted in the maintained schedule.

An information and communications plan will be produced as a part of any future full SAB applications. These plans can be displayed in various areas across the development site to inform and educate site users of the provisions and functions of the various SuDS features in place.

6.2 SAB Application Process

Following the submission of the planning application, a pre-SAB application for the new spine road and associated infrastructure will be submitted to BCBC SAB & Highways with the goal of incorporating any comments into the final design in readiness to submit a full SAB application thereafter.

Within the pre-SAB application submission, various key pieces of information will need to be produced such that a sufficient level of detail is provided to inform the SAB team of the design's ability to effectively mitigate flood risk (up to 100yr + 40% climate change event), provide interception of the first 5mm rainfall, improve water quality by offering a suitable level of pollution removal through the use of SuDS, contribute to amenity and biodiversity in the immediate area, discharge to a suitable location (e.g. infiltration to ground / discharge to existing surface water body / sewer network) and also be designed such that the construction and ongoing future maintenance can be carried out in a safe manner that reduces risk as far as practically possible.

Following submission of the pre-SAB application, the SAB team will typically issue a formal response within the statutory 8-12week period. Following which, any comments are to be addressed by the Designer, relevant amendments made to the pack of information (if required) and any additional information produced that is required for the full SAB submission.

Once the above tasks have been completed, the pack of information can be submitted to BCBC for full SAB approval, following which the SAB team will review in detail and provide further comment (if necessary) and technical approval in due course.

6.3 Phased Applications & Approvals

Due to the phased delivery of various key pieces of infrastructure across the site in order to make development plots accessible, there will be a need to obtain relevant approvals accordingly. Engagement with BCBC SAB and Highways departments will be necessary to obtain SAB approval for specific areas of the development as and when necessary as well as S278 & S38 approvals for alterations to existing, and the adoption of any new, highway assets and S104 approvals with DCWW for the adoption of new foul drainage assets.

SAB & Highway approvals for the new spine road (including the new roundabout off Eastern Promenade, adjacent to Griffin Park and the Aldi supermarket, as well as the new turning head on Mackworth Road) will be sought following submission of the planning application. As the spine road is a key piece of infrastructure that unlocks other development plots across the site, it is vital that detailed design and all relevant approvals for this piece of infrastructure are obtained in a timely manner to ensure construction can begin, and be completed, according to programme.

Relevant approvals for new assets within the remaining plots will take place as and when future developers become involved although key off-plot infrastructure to support them (such as diversion of existing surface water sewers and construction of new wider sewer network and infrastructure) will be required at an early stage.

Refer to Appendix K for The Urbanists Phasing Plan.

7 Flood Risk Overview

7.1.1 Stantec FCA

The Stantec FCA concludes that the proposed development is considered to be at low risk of flooding from all sources providing that all finished floor levels (FFL) are a minimum of 600mm above the design flood level. The assessment confirms that the site is suitable it the current proposed location and will be adequately flood resistant and will not place additional persons at risk of flooding. The flood risk elsewhere outside of the site area will not increase as a result of the proposed redevelopment works and confirms that measures will be put in place to ensure surface water is appropriately managed.

Refer to Appendix L for Stantec Flood Consequence Assessment.

7.1.2 Arup Flood Modelling

Flood modelling has been undertaken by Arup to assess flood risk from tidal / coastal overtopping along Sandy Bay and Eastern Promenade in both the existing and proposed future scenarios. Modelling output of the existing arrangement indicates that two main flood routes (Eastern Promenade and Mackworth Rd) are presented from wave overtopping via the Sandy Bay frontage.

Through the implementation of the proposed regeneration works, the model results indicate a reduction in maximum flood depths and extents North of Sandy Bay as a result of the reduced overtopping of the Sandy Bay frontage. Currently, basement flooding to one of the new buildings is presented, which can be overcome through further refinement of the proposed levels at the higher level of the basement access ramp. Additionally, flooding is also presented at the Buccaneers public house at the Southern end of Mackworth Road which could potentially be mitigated by raising the existing FFL of the building.

7.1.3 Tide-lock scenario at Harbour

The new outfall into the existing harbour is currently considered to be at level high enough to not be subjected to a tide-lock scenario, where the water level in the harbour may influence the water level in the upstream incoming surface water sewer. This will be confirmed with BCBC SAB following the PAC submission. The separate surface water drainage network serving the redevelopment has been kept as shallow as reasonably practical in order to avoid the tide-lock scenario however if it is found that the new outfall would be affected by tide-lock, additional upstream attenuation within the Salt Lake plots will be required in order to store surface water during a worst-case storm event for the duration of the tide-lock period. This point is to be confirmed, and design altered to suit (if required) in readiness for the planning submission.

8 Existing Infrastructure

8.1 Constraints

Various physical constraints exist across the site in the form of existing buried services, drainage assets (rising mains, drains and sewers) as well as existing external infrastructure (such as adopted highway assets, boundary tie-ins and access to existing structures to be retained) as well as ground conditions and design infiltration rates governing the minimum size of the drainage basins serving the proposed Sandy Bay residential development.

A full comprehensive existing constraints plan is to be included within the planning application.

8.2 Proposed Diversions

Several foul and surface water drainage/sewer diversions are required across multiple plots in order to accommodate the proposed development. As recommended in the Redstart Drainage Strategy 2020 (for BCBC), diverted drainage is to be laid with increased diameter pipework in order to increase capacity.

Refer to Appendix A for proposed drainage plan.

9 Development Infrastructure

A large extent of civil engineering infrastructure in the form of earthworks, retaining wall, highway works, external works and drainage will need to be implemented to accommodate the proposed development and ensure it operates in an effective and safe way across the site throughout the project lifecycle.

9.1 External Works

A key initial piece of new infrastructure that will be provided early in the construction programme is the alteration of the existing highway junction near Griffin Park to be reconstructed as a roundabout to provide access to the new spine road which rises up to the current fairground level. This piece of work demands a large extent of new infrastructure such as land clearance, earthworks, engineering fill and retaining walls, which is reflected in Appendix E – Engineering Levels Plan.

During the construction of that phase of the development, the large existing retaining wall to the north of the Coney Beach plot will require reconstruction due to its current condition and suitability to support loads for the future residential and parking development.

To suit the output of the Arup flooding modelling exercise, minimum promenade levels fronting the Coney Beach plot have been considered a crucial constraint that has been incorporated into the design to ensure the new development is sufficiently defended from coastal impact. This plot also ties into the proposed spine road level in order to provide necessary access by vehicles and pedestrians.

The Salt Lake plot comprises of a mix of residential and commercial space, with the hotel and outdoor pool complex situated to the south of the plot. A large extent of public realm space will surround the plots which will comprise of both hard and soft landscape as well as SuDS features throughout.

A new designated surface water sewer that serves the new development and remains independent of any existing networks will drain south along the eastern boundary and discharge to the harbour via a new outfall. The independence of this new sewer will relieve the two other main drainage lines and enable the true capacity and operation of the new system to be proved.

Alterations in the Monster Park area, including the new spine road works, require Mackworth Rd to be split from its current arrangement and therefore the remaining highway infrastructure to the north of the future public open space (POS) will require a turning head and retaining structures due to the immediate level changes between the highway and the POS. Access to the southern end of Mackworth Rd will be provided off of the new spine road.

Sandy Bay residential development will make good use of the viable surface water infiltration within the area, and therefore adequate space for infiltration basins has been provided, the size and volume of which are based on high-level hydraulic modelling. A large earthworks exercise to infill the existing ‘Sandy Bay Bowl’ will be required and although the current strategy seeks to utilise material from the existing bund to the north of the site to reduce imported fill, there is a requirement for significant additional quality fill materials to infill the bowl to the current top level, plus additional filling required to achieve the proposed development plot levels.

9.2 Drainage Strategy

9.3 Surface Water

The surface water network serving the new redevelopment *must* adhere to Schedule 3 of the Flood and Water Management Act 2010 and will be subject to detailed review through the SAB application process. While the detailed landscape design of the various residential and commercial plots will be determined in the future following engagement with potential developers, an initial indicative surface water drainage scheme has been provided to information the PAC. This demonstrates the overall intentions for the development's new surface water system and considers the strategic placement of SuDS in various forms and the areas to be dedicated to SuDS to make all parties, including potential developers, aware of these expectations.

The current surface water strategy seeks to provide an effective system across the development that adheres to relevant national guidance such that SAB approval may be granted in the future.

9.4 Spine Road

Surface water runoff from the new spine road and associated pedestrian footway and cycleways will discharge to the roadside swales which will provide conveyance routes for the runoff whilst also providing interception, water quality improvement and flow restriction prior to discharging into the existing highway drainage network. Infiltration and discharging to a surface water body (such as river or lake) are not viable in this case and therefore the design seeks to satisfy Priority Level 4 for Standard S1 (runoff destination) by discharging to a surface water sewer / highway drain. The roadside swales will be sized in order to provide sufficient interception of the first minimum 5mm rainfall and will provide amenity and biodiversity enhancements to the development, thus satisfying Standards S5 & S6.

The SuDS features and entire surface water drainage network as a whole will be designed such that construction and future operation and maintenance can be carried out as easily and as safely as practically possible thus satisfying Standard S2.

9.5 Coney Beach

The private access road and associated car park serving the Coney Beach plot will rely heavily on extensive SuDS provision to the located at strategic locations across the plot. Roof drainage for the residential blocks will discharge to nearby bioretention areas and the features will be of a suitable size to offer sufficient interception to the corresponding catchment area and will need to be lined with fully lapped and welded impermeable membranes to mitigate the migration of existing contaminants within the soil beneath. The soft SuDS features will also contribute to amenity and biodiversity across the plot, thus satisfying Standards S5 & S6. Permeable block paving will also be used to treat and attenuated surface water runoff from parking bays and car park access road.

Treated surface water leaving the plot will discharge to the new surface water drainage network and discharge to the downstream carrier drain within the eastern edge of the Salt Lake plot which will discharge to the existing harbour to the south via a new outfall at an unrestricted rate due to this being treated as a direct discharge to the sea. Due to infiltration not being practical on such a contaminated site, the next highest priority regarding discharge destination will be to a surface water body thus the current design seeks to satisfy Priority Level 3 for Standard S1 (runoff destination).

The SuDS features and entire surface water drainage network as a whole will be designed such that construction and future operation and maintenance can be carried out as easily and as safely as practically possible thus satisfying Standard S2.

9.6 Salt Lake

The vast expanse of external public realm space will rely heavily on extensive SuDS provision to the located at strategic locations across the plot. Roof drainage for the residential and commercial blocks will discharge to nearby bioretention areas and the features will be of a suitable size to offer sufficient interception to the corresponding catchment area and will need to be lined with fully lapped and welded impermeable membranes to mitigate the migration of existing contaminants within the soil beneath. Permeable block paving will also be used to treat and attenuated surface water runoff from parking bays and car park access roads. The soft SuDS features will also provide important amenity and biodiversity enhancements across the plot

Treated surface water leaving the plot will discharge to the new main surface water carrier drain within the eastern edge of the Salt Lake plot which will discharge to the existing harbour to the south via a new outfall at an unrestricted rate due to this being treated as a direct discharge to the sea. Due to infiltration not being practical on such a contaminated site, the next highest priority regarding discharge destination will be to a surface water body thus the current design seeks to satisfy Priority Level 3 for Standard S1 (runoff destination).

The SuDS features and entire surface water drainage network as a whole will be designed such that construction and future operation and maintenance can be carried out as easily and as safely as practically possible thus satisfying Standard S2.

9.7 Sandy Bay

The Sandy Bay residential development will utilise permeable block paving and bioretention areas to intercept and improve the water quality of surface water runoff prior to discharging to the large infiltration basins. The development also seeks to utilise conveyance swales to drain highway and footpath runoff at surface level and discharge to the infiltration basins whilst providing additional interception, water quality improvements and flow restriction along the way. These soft SuDS features will also provide important amenity and biodiversity enhancements across the plot, thus satisfying Standards S5 & S6.

Due to rainwater harvesting currently being discounted as a viable means of surface water discharge, the next highest priority regarding discharge destination will infiltration to ground thus the current design seeks to satisfy Priority Level 2 for Standard S1 (runoff destination).

The SuDS features and entire surface water drainage network as a whole will be designed such that construction and future operation and maintenance can be carried out as easily and as safely as practically possible thus satisfying Standard S2.

9.7.1 Foul Water

The proposed independent foul water drainage strategy requires the use of a gravity sewer network as well as pumping stations and rising main infrastructure in order to convey foul flows to a suitable location offsite, subject to ongoing discussions, modelling, design with DCWW.

The Coney Beach and Salt Lake plots will gravitate to the new pumping station indicate to the southern boundary of Griffin Park which will convey flows to the pumping station to the eastern boundary of the Sandy Bay plot via a new foul water rising main. The Sandy Bay residential development itself will have its own separate foul sewer network that gravitates to the new pumping station at the eastern boundary of the plot. Foul flows will converge at this point and will communicate with the existing foul drainage network leading to the Ogmore WwTW at a suitable location to be determined by DCWW through the process agreed with them to investigate and design a solution that does not pose any risk to the town's existing drainage infrastructure.

It is important to reiterate that following final completion of the regeneration works, no additional foul flows arising from the new development will communicate with the local foul sewer network in the immediate vicinity of the development site.

Separate foul sewer networks solely serving the new development will be provided and are to only communicate with the existing wider foul water network at a point deemed suitable by DCWW and following any required upgrade works to further protect the local foul water network from flooding due to a shortfall of capacity.

It is known and understood that parts of the existing local sewerage infrastructure are at capacity and can experience flooding and sewer overflows. It is also understood that this is a sensitive local issue within the community and is therefore a critical point of consideration in preparing the foul drainage infrastructure strategy for the proposed development.

As a result, no reliance on the existing piped foul/combined sewer network around the immediate vicinity of the development area is considered. The former fair site will be disconnected from the existing foul/combined sewerage infrastructure and a designated network of new and independent foul sewers and pumping stations are proposed to serve the proposed development, which is presented indicatively in the accompanying information. There are no proposals to discharge additional foul flows from the new development to any existing local sewers around the development area boundary; this is to avoid contributing to existing operational and flooding issues within those sewers.

A suitable single point of discharge to the wider existing sewer network is being considered by the development team and Dŵr Cymru Welsh Water, through a collaborative process that includes investigation, hydraulic modelling and a design process ahead of eventual construction. This is to ensure that a proven, safe and effective point of discharge is determined, that does not pose any risk to local sewer flooding in any part of the town and surroundings.

The collaborative process with Dŵr Cymru Welsh Water is ongoing and will extend beyond PAC and outline planning submission dates due to the scale of the works and parties involved. The general principles of the proposed new independent foul sewer network serving the proposed development is accepted by DCWW and the focus must be on determining or creating a safe point of discharge within the wider sewer network.

No development that requires a foul drainage connection will be completed before a proven suitable and safe point of connection to a major point on the downstream sewer network is determined,

including the proportional completion any identified essential reinforcement and upgrade works. This also includes consideration of the receiving wastewater treatment works capacity.

The monitoring, operation, maintenance and improvement of the existing sewerage infrastructure that lies outside the development area remains the responsibility of Dŵr Cymru Welsh Water.

No surface water runoff (rainwater) will connect to the development's new foul drainage system. Any existing surface water currently reaching the foul/combined drainage system from within the development area will cease and be drained by a new sustainable drainage system that does not influence the foul drainage system at all.

10 Post Planning Objectives

Following the PAC submission, Stantec will engage with BCBC further in order to further discuss relevant topics such as the surface water drainage design parameters and constraints and to discuss the process for future approvals and consents, such as phased S278, S38 and SAB approvals that will need to be obtained prior to construction.

Furthermore, regular engagements with DCWW will be carried out, as previously mentioned, with the goal of determining a suitable single sewer connection point for the new foul system serving the new development and the scope of any required network upgrade works. Separate conversations will also be held regarding phased S104 (sewer adoption) and S106 (sewer connection) approvals as and when appropriate through the life of the development.

Appendix A – Proposed Drainage Plan

Appendix B - SuDS Strategy Plan

Appendix C – Typical SuDS Details

Appendix D – Existing Drainage Plan

Appendix E - Engineering Levels Plan

Appendix F - Cut & Fill Analysis

Appendix G - Spine Road General Arrangement

Appendix H - Spine Road Sections

Appendix J - The Urbanists Site Masterplan Layout

Appendix K – The Urbanists Phasing Plan

Appendix L – Flood Consequence Assessment

Appendix M – Topographical Survey

Appendix N – Ground Investigation Report

Appendix O – Arup Flood Modelling

Stantec

Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

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