Taylor Wimpey (South Wales), Persimmon Homes & Barratt David Wilson Homes South Wales

Environmental Permit Application – Supporting Notes

East Quay, Barry

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RSK Environment Limited (RSK) has prepared this document at the instruction Taylor Wimpey South Wales, Persimmon Homes & Barratt David Wilson Homes South Wales

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1 INTRODUCTION

This document is presented in support of an application for an Environmental Permit to discharge treated waters generated during the installation of foul drainage to support the East Quay development, Cory Way, Barry. Additional and supporting information to that provided in the application forms is included.

Sections 1 and 2 also provide a non-technical summary of the planned discharge.

The site is located at the East Quay within Barry Docks and occupies an area of former industrial land use. All former above-ground and associated below-ground industrial structures have been removed, with ground conditions amended/raised to a level suitable for flood resilience and residential end use.

The site is split between three consortium members including Taylor Wimpey (South Wales business unit), Persimmon Homes (PHL) and Barratt-David Wilson Homes (BDW), with each company responsible for building out their own development area. The site is broadly split into four areas with BDW owning the western parcel of land and a second smaller parcel of land located east of Cory Way. PHL own the central parcel of land with Taylor Wimpey owning the eastern parcel of land adjacent to Cory Way. The site location and division of the site ownership is presented as **Figure 1**. All three consortium members are legally and equally responsible for the shared infrastructure including the shared surface water (storm) drainage, shared foul drainage, shared surface water outfalls to the dock and the shared main roads. Each developer has one outfall that is dedicated to their respective development area. A further two outfalls provide shared discharge between all three consortium members. These shared outfalls are located on the land parcel developed by PHL.

This environmental permit application relates to the outfall that is shared between the three consortium members, namely Taylor Wimpey, PHL and BDW, and does not cover outfalls that are individual to each consortium member. Natural Resources Wales (NRW) have issued a permit to Taylor Wimpey for the individual outfall servicing Taylor Wimpey's development area under reference EPR/CB3692CX.

The wider East Quay development covers approximately 5.5 hectares (Ha) in area and is centred at National Grid Reference (NGR) ST 12393 67479.

The site comprises the former East Quay within Barry Docks with the former Graving Dock located immediately north of the BDW and PHL parcels and west of the Taylor Wimpey parcel. Dock Number 2 is located and south of the development site, such that the site is mostly surrounded by docks and water, apart from on the eastern site boundary. Main access is provided from the east via Cory Way beyond which is a second smaller parcel of the development which is in the ownership of BDW (reference **Figure 1**).

Plans showing the proposed development, including the surface water and foul drainage arrangements are provided in **Figures 2**.

The development area currently comprises ongoing development for residential housing. All piled foundations have been installed and above-ground construction has commenced. The development area is bounded to the east by Cory Way and includes four access points. The former Graving Dock bounds the site to the west. An area of future public open space (POS) is located to the north and currently houses a stockpile of demolition rubble and soil arisings. An area set aside for ecological benefit is located along the southern perimeter of the site.

The following general construction elements are anticipated as part of the development. A proposed development plan is presented as **Figures 2**:

- Construction of residential units across the East Quay development.
- The majority of the development will comprise hardstanding with a POS to the north/north-west of the Taylor Wimpey plot.
- Construction of several public highways to provide access to new residential areas, including associated infrastructure (foul and surface water (storm) drainage).

All public highways will consist of standard highway specification. Engineering drawings are presented as **Figures 2**.

The primary surface water receptor is the Graving Dock. The Graving Dock is hydraulically linked to Docks Number 1 and 2. Water is retained within Docks Number 1 and 2 by lock gates (caisson) to the south of the wider Barry port on the estuary with the Bristol Channel. Water levels within the docks are controlled by Associated British Ports (ABP), port activities and tidal movements.

The discharge point for treated water subject to this application is located on the northern side of the Graving Dock at approximate National Grid reference ST 12348 67521.

2 DISCHARGE WATER DESCRIPTION

A copy of the engineering drawings for the site are appended as **Figures 2** and should be referred to. The drawings set out the drainage system for foul waters (depicted as ***brown*** lines on the plans) for the development area. Storm lines are depicted in ***blue***.

A surface water management plan (SWMP), presented within **Appendix A**, has been developed for the site with the surface water mitigation set out within that report, already installed. Furthermore, fortnightly surface water inspections are undertaken by RSK at the site to review and where necessary, recommend amendments and additions to the mitigation strategy. A site specific Construction Environmental Management Plan (CEMP) has also been produced for this site and is included in **Appendix B**.

With respect to the drainage works that relate to the permit application, a foul drainage run in Cory Way to support the wider residential development, requires dewatering to facilitate its construction. Water enters the excavations on a mid to high tide and poses a risk to the safety of site personnel undertaking the drainage installation work. Whilst every endeavour has been made to schedule works in neap tides and coordinate with ABPs Harbour Master to lower the dock levels, the water levels encountered within the excavation are not sufficiently low to facilitate the safe installation of the deep drainage. As a result, the contractors are in a position where water must be pumped out from the excavation to facilitate the drainage installation work.

The temporary nature of the proposed work means that they are not considered to last for a significant length of time. The drainage work is anticipated to take approximately 4 weeks however, this will be influenced by prevailing weather and site conditions, as well as upcoming public holidays (Christmas and New Year).

Water discharged from the proposed discharge point will consist of water that has entered into the excavation for the construction of foul drainage run in the vicinity of NGR ST 12436 67586. It is reiterated that no foul water is present given that the foul system has not yet been constructed. This permit is not associated with the pumping or treatment of foul water. Owing the nature of activities being undertaken to install the drainage system, silt may become entrained within the water entering into the excavation. Accordingly, mitigation in the form of active water treatment has been prescribed to minimise the remobilisation of silt and for the removal of silt from water, prior to discharge to surface waters (dock).

A site plan showing the indicative treatment, pumping, monitoring and discharge arrangements associated with the proposed foul drainage installation work is presented on **Figure 3**.

The proposed treatment method comprises the active treatment to remove silt from water via the dosing with chemical coagulants, flocculants and a pH Balancer (if required). Following dosing, the water will be passed into settlement tanks whereby gravity assisted settlement will occur. Once gravity settlement has been completed, the treated water will be discharged via dedicated pipework into the dock.

3 ENVIRONMENTAL MANAGEMENT SYSTEMS

Taylor Wimpey, PHL and BDW each have environmental management systems in place. These are detailed below.

The environmental management systems for each member of the consortium have been built around the requirements of both ISO14001:2004 and OHSAS18001:2018. The consortium members seek to minimise the impact of their site operations, particularly in relation to climate change, energy, water, waste biodiversity through compliance with these certified systems. The consortium members are audited on a regular basis with relevant employees provided with specific environmental training.

4 QUALITY OF DISCHARGE WATER

Prior to development work commencing, geo-environmental investigations were undertaken to assess environmental risks at the site resulting from previous land uses. A copy of the most recent geo-environmental assessment is presented within **Appendix C**.

The report describes a site wide investigation of soil and controlled water conditions. The controlled water assessment included a detailed quantitative risk assessment (DQRA) and derived site-specific assessment criteria (SSAC). The controlled water risk assessment also assessed potential risks to the dock water from groundwater beneath the site. The report concluded that based upon the results of the DQRA modelling and the application of a dilution factor it can be demonstrated that the majority of the identified contaminants of concern in the groundwater underlying the site did not pose a significant risk to the docks water quality, either via leaching or dissolved-phase migration. The report recommended localised source removal of Made Ground to alleviate potential copper leaching to groundwater and a remedial strategy was prepared, as presented in **Appendix C**. It should be noted that the remedial strategy, geotechnical requirements and flood alleviation requirements resulted in the need to raise site levels with suitable imported and/or appropriate site won material therefore removing, by physical capping, potential contaminant sources within soil from surface waters (rainwater) attenuation during the construction phase and any water treatment of these surface waters set out within the silt mitigation strategy.

During construction work, the storage and use of fuel and lubricating oils and possibly other materials typical of an active construction site, will be necessary. However, all such activities will be undertaken in accordance with current regulations and best practice.

With these controls in place, construction activities present a negligible risk of causing hazardous substances to be present in the water pumped from the excavation for the installation of the foul drainage infrastructure. Furthermore, waters are not likely to result in the remobilisation of historical contaminants from across the East Quay Development site (if present) due to the remedial works undertaken.

The principal potential contaminant from the water pumped from the excavation for the foul drainage installation is therefore considered to be silt (suspended solids) associated with exposed soil and rainfall runoff, which is further assessed in Section 5. Groundwater levels will be subject to tide times/port water levels, controlled by ABP for the wider dock environment.

5 RISK ASSESSMENT

An assessment of the environmental risks of the operations covered under this application for a discharge consent has been prepared in accordance with the principles of the H1 methodology stated below:

- Step 1 – identify risks
- Step 2 – assess risks
- Step 3 – justify appropriate measures (if needed)
- Step 4 – present the assessment.

The development of the East Quay development has already commenced, with an indicative completion date of April 2026.

Step 1: Identify Risks

The H1 overview document identifies the following different types of risk to the environment.

- odour – there are no potentially odorous activities or chemicals associated with the construction work.
- noise & vibration – construction noise & vibration will occur but be limited to the allowed working hours (0800-1800 Monday to Friday and 0800 to 1400 Saturday). Noise & vibration resulting from the discharge activity are not envisaged as being significantly more noticeable than from the other construction activities at the site.
- accidents – the potential for accidents to occur exists. The potential for contamination of the receiving surface water (docks) will be managed to acceptable levels by the control measures put in place for the construction activities.
- fugitive emissions to air and water - no significant risks have been identified for emissions to air. The potential for contamination of the surface water receptor (docks) will be managed to acceptable levels by the control measures put in place for the construction activities.
- controlled releases to air – there are no point source emissions to air.
- controlled discharges to surface water – a discharge location has been identified to the dock, reference **Figure 3**.
- controlled discharges to ground or groundwater – there are no point source discharges to groundwater.
- global warming potential – insignificant.
- site waste – the quantity of site waste generated will be small and consist primarily of silt/sediment removed from the surface water management system. This would be disposed of at an off site landfill.

Steps 2/3/4 – Assess Risks etc

In accordance with the H1 methodology guidance the following have been assessed.

- Accidents.
- surface water discharges.

Due to the proximity of nearby surface waters, it is not considered necessary to consider risks to groundwater. Groundwater beneath the site will be in hydraulic continuity with the dock water.

Accidents

The site is secured by fencing with no public access. Therefore accidental releases as a result of vandalism are not likely. However, the potential for accidents/accidental releases of contaminants on the construction site cannot be discounted and is assessed.

A risk assessment for accidents, in line with H1 Annex A, follows the next section.

Discharges to Surface Water

The water to be discharged comprises solely of water sourced from the drainage excavations which has then undergone active treatment to remove any entrained suspended solids. Groundwater across the site is subject to tidal variation and water level heights within the dock, as controlled by ABP and their business needs/port activities. The amount of water discharged into the dock may vary depending on factors such as rainfall, tidal variation and water level heights within the dock. Discharged water will be clean and free of suspended solids.

Under conditions prior to development works, rainwater falling across the wider development would have entered the previous drainage system that also discharged to the dock at locations understood to have been at the same position as the new outfall. As such, the water to be discharged during this construction period would naturally enter the dock identified. Under the proposals for the works there is the potential for additional solids to be mobilised due to the proposed drainage installation activity however, as stated, these will be reduced by the active treatment method, and on site management practices set out in the SWMP. The impact of the discharge of clean water from the site can therefore be considered to be not significant in terms of the impact on the dock. Water will enter via direct discharge from dedicated pipework connected to the outfall of the active treatment system.

Given the permeability of the ground, much of the surface water rainfall is also anticipated to infiltrate (prior to final hardstanding installed) to ground and migrate to the dock.

The discharge will be at ambient conditions so there will be no temperature effects as a result of the discharge.

As the discharge will not normally contain any hazardous substances, sanitary determinants or other pollutants, detailed assessments in line with H1 Annexes D1 and D2 are not necessary, as indicated in the flow chart of H1 Annex D. The only assessment required is for accidents. This assessment follows.

Risk Assessment for Accidents

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk?
Leak/spillage of hazardous material on site (e.g. oils and fuels)	Dock	Via infiltration, overland flow or via the surface water drainage system (storm system)	Containment measures for storage. All fuel stored in bunded cells with double walls, additional capacity, dip trays/sump pallet and spill kits. Minimisation of storage volumes to those required for routine operations. Maintenance & inspection	Unlikely	Contamination of dock water with hazardous substances.	Low – due to procedures detailed in the Construction Environmental Management Plans (CEMP) (e.g. fuel/oil use and storage, waste/material storage). Distance from surface water receptor further reduces the likelihood.
Leak of oil/fuel from pumps used as part of a water treatment system or other temporary pumping activity	Dock			Unlikely		
Discharge of water containing suspended solids (silt)	Dock	Pumped direct, or overland flow across the site, or the direct discharge from the outfall	Silt mitigation measures set out within site-specific SWMP including silt fences, cut off bunds, bunging of the outfall, chemical coagulant and flocculant treatments. Monitoring and testing of discharge to be free of silt.	Low	Contamination of dock water with suspended solids (silt).	Low – with silt management measures in the SWMP to reduce the potential for additional silt to be present in the excavation water. Suspended solids to be removed from water via active treatment (Siltbuster) system prior to discharge. If the water shows signs of silt, the discharge will be suspended and the treatment system inspected for signs of a fault. If no fault is identified, the treatment system supplier will be contacted and a revised dosing trial will be undertaken and chemical dosing rates will be updated as necessary.

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk?
Discharge of water containing chemicals from active treatment process (Poly Aluminium Chloride & Aquatreat 2084)	Dock	Pumped direct, or overland flow across the site, or the direct discharge from the outfall	Completion of a thorough chemical dosing trial by the supplier of the active treatment system to determine the appropriate chemical dosing rates prior to the commencement active treatment activities. Monitoring and testing of discharge.	Low	Contamination of dock water with dosing chemicals.	Low – The completion of a dosing trial by the supplier of the active treatment system will ensure that the correct volumes of the chemicals are applied to the incoming water and that there are no residual chemicals in the treated water upon discharge. If monitoring and testing identify the potential imbalance in chemical dosing rates, the treatment system supplier will be contacted and a revised dosing trial will be undertaken and chemical dosing rates will be updated as necessary.
Spillage of collected solids from settlement system	Dock	Via overland flow or direct ingress, via surface water drainage system	Method statement for cleaning settlement system.	Very unlikely	Contamination of dock water with suspended solids (silt).	Low – settlement system to be cleaned in such a way as to prevent silt spillage. To be cleaned by a specialist settlement tank provider (Siltbuster). Distance from surface water receptor and drainage system further reduces the likelihood. Surface water outfalls will be bunged.
Failure of pumping equipment – overflow of water into drainage etc.	Dock	Via surface flow or surface water drainage system	Silt mitigation measures set out within site-specific SWMP	Unlikely	Contamination of dock water with suspended solids (silt).	Low – water is contained on site within the excavation if pumps fail. Water levels within the excavation controlled by surrounding dock levels which are below ground level.
Vandalism	Dock	Via surface flow	Site is secure without public access.	Unlikely	Contamination of dock water	Low - due to security arrangements.

6 DISCHARGE VOLUMES

The maximum discharge rate will be 89 litres per second (l/s), a breakdown of the associated daily volumes is provided below:

Maximum Instantaneous Pumping Rate	Maximum Pumping Rate (per minute)	Maximum Hourly Pump Rate
89 l/s	5,340 l/min	320,400 l/hr
0.089 m^3/day	5.34 m^3/min	320.4 m^3/hr

Based on the above, the maximum discharge associated with the proposed activity over an 8-hour working day is **2,563.2 m^3/day**.

7 TREATMENT

Active treatment will be utilised to remove suspended solids from the excavation water prior to its discharge into the dock. Silt levels across the wider site will be controlled by the aforementioned site wide SWMP which details the site's surface water and silt management strategy. A copy of the SWMP is included in **Appendix A**.

The selected treatment system will utilise of a Siltbuster system. This will comprise of a chemical pre-treatment system, which will dose incoming water with a flocculant, coagulant and a pH balancer (if required). A flow-splitter manifold will then distribute the dosed water into multiple gravity operated settlement tanks (e.g. lamella tanks), which will remove the particles from suspension by gravity and capture them within the individual settlement tank units. The treated water will then be discharged from the treatment system and transferred via dedicated pipework to the designated discharge point (ST 12348 67521).

Settlement tests have been completed showing that there is a clay fraction in the water requiring the use of flocculants/coagulants to enable solid separation prior to the water being returned to the dock.

The selected treatment system will utilise Poly Aluminium Chloride (PAC) as a coagulant and the anionic polymer AQ2084 (otherwise known as Aquatreat 2084) as the flocculant. Safety Data Sheets for both of these chemicals are included in **Appendix D**.

Prior to the commencement of active treatment activities, a dosing trial will be completed by the treatment system supplier (Siltbuster) to confirm the appropriate dosing rate for the treatment system.

In addition to the application of the aforementioned chemical coagulant and flocculant, if there is a lack of natural buffering within the on-site waters, there is the potential for the pH of the treated water to drop below 6 following the introduction of the PAC.

In such an event the chemical pre-treatment system will include the introduction of sodium hydroxide on a pH proportional basis to increase the water pH to neutral prior to adding the AQ2084 flocculant as the final dosing stage.

The application of a sodium hydroxide pH balancer is not required at every treatment site and it usage is determined by the natural buffering capacity of the on-site water. Accordingly, laboratory testing of the on-site waters will be completed by the supplier of the active treatment system prior to the commencement of treatment operations to confirm the natural buffering capacity of the on-site water. This will consequently determine whether the addition of sodium hydroxide is required for the proposed treatment system.

Regardless of whether the application of sodium hydroxide will be required for the proposed treatment activities, a copy of the sodium hydroxide Safety Date Sheet; also referred to as caustic soda liquor, is included in **Appendix D**.

As mentioned previously, a site plan showing the indicative treatment, pumping, monitoring and discharge arrangements associated with the proposed foul drainage installation works is presented in **Figure 3**.

It is considered important to highlight that owing to the nature of activities undertaken at the site, there is the potential for certain aspects of the proposed treatment system to be relocated to facilitate the continuation of wider site activities, such as updated vehicle movement routes or material storage areas.

The treatment system aspects that have the potential to be relocated include the final placement of the Siltbuster treatment system within the area identified on the enclosed site plan and the route of the dedicated pipework transferring to the appropriate discharge point at National Grid Reference ST 12348 67521.

Whilst it is considered that the routes and positions depicted in the enclosed site plan provides a representative arrangement layout, it was considered prudent to mark these as indicative locations in light of their potential to be relocated slightly during the construction lifecycle. It is noted that the anticipated construction programme is only approximately four weeks and therefore relocation is unlikely.

The proposed monitoring point for the treatment system is set for the internal outlet for the treatment system. A National Grid Reference of ST 12365 67644 has been included has been provided and depicted on **Figure 3**, however, this should be considered as an indicative location since the final monitoring point may be located in the vicinity of this point.

Prior to any discharge of treated water to the surface water receptor, it would be necessary to test and monitor the water quality to ensure that the treatment has been successful and that suspended solids have been removed to the concentration stated within the Environmental Permit, assumed to be 50 mg/l.

Due to the use of a PAC coagulant, total aluminium would also be tested, to confirm that concentrations do not exceed the maximum threshold stated in the Environmental Permit, assumed to be 1,000 µg/l.

When operational, the treatment system would be visually inspected on a daily basis. Should any evidence of faults be identified the treatment and discharge will be suspended and suitable expertise from the supplier sought to address any issues or concerns prior to restarting the treatment process.

In addition to daily visual inspections, water samples would be collected on a during the treatment process using flocculants and submitted to a laboratory for testing of total suspended solid (TSS), total aluminium and pH. TSS is measured in milligrams per litre (mg/l), this relates to the dry weight of solids in a litre of water. This test therefore needs to be conducted at a laboratory, because the test requires the sediment to be filtered, dried, and weighed. It is proposed that samples are collected on a weekly frequency, with additional spot samples collected as deemed appropriate throughout the lifespan of the treatment system.

Maintenance of the surface water mitigation measures, in the form of the settlement tanks and their de-silting would be needed throughout the operational functionality of the equipment. The maintenance would be undertaken by the supplier of the equipment. It is likely that silted tanks would be removed from site and replaced by clean tanks on a routine basis with the supplier undertaking the cleaning at this permitted depot. This would ensure that there is no risk to the dock water from cleaning activity and that disposed silt is taken to a licensed waste facility (landfill) by the tank supplier.

FIGURES

APPENDIX A
SITE-SPECIFIC SURFACE WATER MANAGEMENT PLAN

APPENDIX B
CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

APPENDIX C
SITE INVESTIGATION & REMEDIATION REPORTS

APPENDIX D
COAGULANT, FLOCCULENT AND PH BALANCER SAFETY DATA SHEETS