



Taylor Wimpey South Wales

Environmental Permit Application – Supporting Notes

Taylor Wimpey development area, East Quay, Barry

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1 INTRODUCTION

This document is presented in support of an application for an Environmental Permit to discharge surface waters during the construction phase of the Taylor Wimpey development area at East Quay, Barry. Additional and supporting information to that provided in the application forms is included, and the application forms referenced the various sections herein.

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

The site is located on 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 residential end use.

The site is split between three consortium members including Taylor Wimpey South Wales, 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 equally responsible for the associated infrastructure including the surface water (storm) drainage and associated outfalls to the dock. Each developer has one outfall that is dedicated to their respective development area, with a further two outfalls that provide shared discharge between all three consortium members.

This environmental permit application relates to the outfall that services the Taylor Wimpey development area only. The joint outfalls and the outfalls servicing PHL and BDW are not covered by this permit application and it is the responsibility of the third party developers to apply for relevant permits associated with the discharge of surface water during their construction phases. It is understood that PHL is leading on the permit application for the joint outfalls under a separate application.

The wider development of East Quay covering all three developer plots is of approximately 5.5 hectares (Ha) in area and is centred at national Grid Reference ST 12393 67479. The Taylor Wimpey development area forms the eastern plot on the main development site and is centred at ST 12435 67525.

The wider site forms 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**).

A proposed development plan, showing the surface water drainage arrangement is provided as **Figure 2**, which sets out the division of the site between the consortium members.

The Taylor Wimpey development area currently comprises a featureless area of former industrial land use, which has been subject to demolition. Piling for future development has commenced. No other above ground development is evident. The development area is bounded to the east by Cory Way and includes an access point. 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. An area set aside for ecological benefit is located south of the Taylor Wimpey plot.

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

- Construction of residential units across the Taylor Wimpey area.
- 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 comprise of standard highway specification. Engineering drawings are presented as **Figures 2**.

The primary surface water receptor is the Graving Dock to which all surface water (rainfall) will be discharged, both during the construction phase and when the development is complete. 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.

One outfall that exclusively services the Taylor Wimpey development area is proposed. This outfall would be located on the northern side of the Graving Dock at National Grid reference ST 12387 67539 and for which this permit application is applicable. It is noted that two additional outfalls that service the joint consortium site, including the Taylor Wimpey development area are proposed. These would be located on the southern side of the Graving Dock at approximate National Grid references ST 12402 67520 and ST 12398 67518. However, due to the joint ownership of these outfalls, they **do not form part of this application** and a separate permit application is understood to be made by PHL for the joint outfalls.

2 SURFACE WATER DISCHARGE DESCRIPTION

A copy of the engineering drawings for the site are appended as **Figure 2** and should be referred to. The drawings set out the drainage system for surface waters (referenced storm drainage in **blue** lines on the plans) for the development area. With respect to the development, surface water refers to rainfall falling across the development footprint. There are no streams, culverts or rivers that cross or adjoin the site that might also be considered to be surface water. The surface water drainage system comprises a series of below ground pipes that collect surface waters from roofs, roads, pavements and areas of hardstanding and convey this water towards the outfall on the northern side of the Graving Dock. The footprint of the area drained by the outfall on the northern side of the Graving Dock relates to units 421 to 426 only, with the remaining area/units of the Taylor Wimpey development area discharging water via the joint outfalls on the southern side of the Graving Dock. No attenuation basin or other surface water structures are proposed, with discharge made to the dock via an outfall with a flap valve.

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, monthly surface water inspections are undertaken by RSK at the site to review and where necessary, recommend amendments and additions to the mitigation strategy. It should be noted that the SWMP incorporates the wider site, including the PHL and BDW development areas.

Surface water across the site will comprise rainfall, falling onto the Taylor Wimpey development area, including haul roads, building footings and areas of disturbed/exposed ground following the installation of below ground infrastructure and the raising of site levels to finished floor levels (FFL). Furthermore, surface waters may migrate from neighbouring developers plots (BDW or PHL) to the Taylor Wimpey area. As a result of general construction activity, silt may become entrained within the surface water runoff, for which mitigation has been prescribed to minimise the remobilisation of silt and for the removal of silt from water, prior to discharge to surface waters (dock). The proposed treatment may comprise both passive and/or active methods to remove silt from water, with a focus on passive mitigation. However, the future requirement for water treatment using chemical flocculants cannot be fully discounted and is subject to future site conditions. Therefore an Environmental Permit is being applied for.

3 ENVIRONMENTAL MANAGEMENT SYSTEMS

Taylor Wimpey have environmental management systems in place. These are detailed below.

Taylor Wimpey HSE management system has been built around the requirements of both ISO14001:2004 and OHSAS18001:2018. Taylor Wimpey 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. Taylor Wimpey is audited on a regular basis with relevant employees provided with specific environmental training.

4 QUALITY OF DISCHARGE WATER

Prior to development works 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 B**. It should be noted that report covers the wider East Quay development, including the land parcels under construction by BDW and PHL. 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. 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 B**. It should be noted that the source of elevated copper in soil was not located on the Taylor Wimpey land parcel. Furthermore, 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 materials, 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 discharged surface water. Furthermore, surface waters are not likely to result in the remobilisation of historical contaminants from across the Taylor Wimpey site (if present) due to the remedial works undertaken. Piles used on site comprise driven pre-cast concrete piles with displacement of ground therefore these have not resulted in arisings having been brought to the surface. Drainage runs are not over deepened.

The principal potential contaminant to surface waters is therefore silt (suspended solids) associated with exposed soil and rainfall runoff, which is further assessed in Section 5. The quality of water will also be rainfall dependant and vary over the season.

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 Taylor Wimpey area is anticipated to commence April 2022, 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 1** and **2**.
- 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 is 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.

Surface Water Discharges

The water to be discharged comprises solely rainwater having fallen on the development area and flowed across the surface into the surface drainage network, or over ground towards the site boundaries. It may also at times be necessary to pump rainwater from excavations into the surface drainage network. The amount of surface water run-off requiring discharge will be dependent upon rainfall rates and seasonality. Surface water run-off will be clean and uncontaminated (after solids removal).

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 outfalls. 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 construction activity on site, however as stated above and below, these will be reduced by settlement and filtration methods, and on site management practices set out in the SWMP to reduce silt on roadways. The impact of the discharge of clean and uncontaminated 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 the outfalls that have a flap valve.

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).
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 from site boundary, 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, flocculant treatments. Monitoring and testing of discharge to be free of silt.	Low	Contamination of dock water with suspended solids (silt).	Low – with treatment, suspended solids to be removed from water prior to discharge.
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. Outfall to be bunged during cleaning. To be cleaned by specialist provider.

Failure of pumping equipment – overflow of water from 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 if pump fails.
Vandalism	Dock	Via surface flow	Site is secure without public access.	Unlikely	Contamination of dock water	Low - due to security arrangements

6 DISCHARGE VOLUMES

It is understood that the discharge volumes from the outfall on the northern side of the Graving Dock will only be minor given that the outfall provides discharge for a limited number of properties (units 421 to 426) only. These are considered to be lateral discharges only, not the main discharge, which is south of the Graving dock and under joint consortium ownership. Therefore, based on Building Regulations Part H, the expected discharge rate would be 1.55 l/s per plot. This is calculated based on a roof and hardstanding area, per plot, of 110.84 m², assuming a rainfall event of 50mm. the resulting discharge for six units would therefore be 9.3 l/s.

7 TREATMENT

The use of flocculants may be required in addition to passive silt settlement methods, to ensure that clean, silt free water is discharged to the stream. A SWMP has been prepared and is included at **Appendix A**, which should be read as it sets out in detail the proposed silt management strategy.

Dosing of water with a flocculant would be the most suitable option given the site constraints and proximity to the receiving water (dock). In RSK's experience, the use of Water Lynx™ 494 & 360 chemical flocculants has proven to be very effective for the safe removal of suspended solids. A copy of the flocculant material safety data sheets (MSDS) for the proposed chemicals is presented within **Appendix C**.

Given the site constraints, the most suitable application of flocculants would be using a traditional settlement chamber, or lamella chamber and associated pump. The flocculant would be applied in block form to the settlement chamber with water pumped across the blocks to allow shear stress to release the active chemical into the water column. The water may need to be recirculated through additional settlement tanks to provide sufficient time for the floc to form.

The sampling point would be the final settlement tank, or final chamber of a tank if only using one tank, prior to discharge. Given the mobile nature of the settlement tanks, there is no definitive grid coordinate for the sampling point, however, it would be prudent to locate the water treatment plant close to the outfall and therefore a grid reference of ST 12387 67545, near to the outfall has been provided.

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.

Water samples would be collected during the treatment process using flocculants and submitted to a laboratory for testing of total suspended solid (TSS) 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 may be necessary to monitor water quality whilst on site and at short notice for decision making on treatment and discharge options. To achieve this, a portable turbidity meter would be used. Turbidity (NTU) is measured in nephelometric turbidity units (NTU), this relates to the transparency or clarity of the water. This test can be conducted in a few minutes in the field using meters.

There is not a direct correlation between TSS and NTU. Therefore it is proposed to establish the relationship between TSS and NTU, using an 18-point calibration curve. This would strengthen confidence in using an NTU value on site during short term decision making to equate to the TSS expressed. It is important to note that it is not an absolute value however, it is considered to be a robust quantitative method for assessing water quality whilst on site in the very short term.

Turbidity measurements would be collected during treatment for the final water (i.e. that leaving the treatment plant).

The use of a NTU calibration curve and NTU testing as an on site screening criterion would ensure that treated discharge is stopped immediately, if the NTU suggests that the TSS would be exceeded and allows for further corrective actions to be put in place.

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.

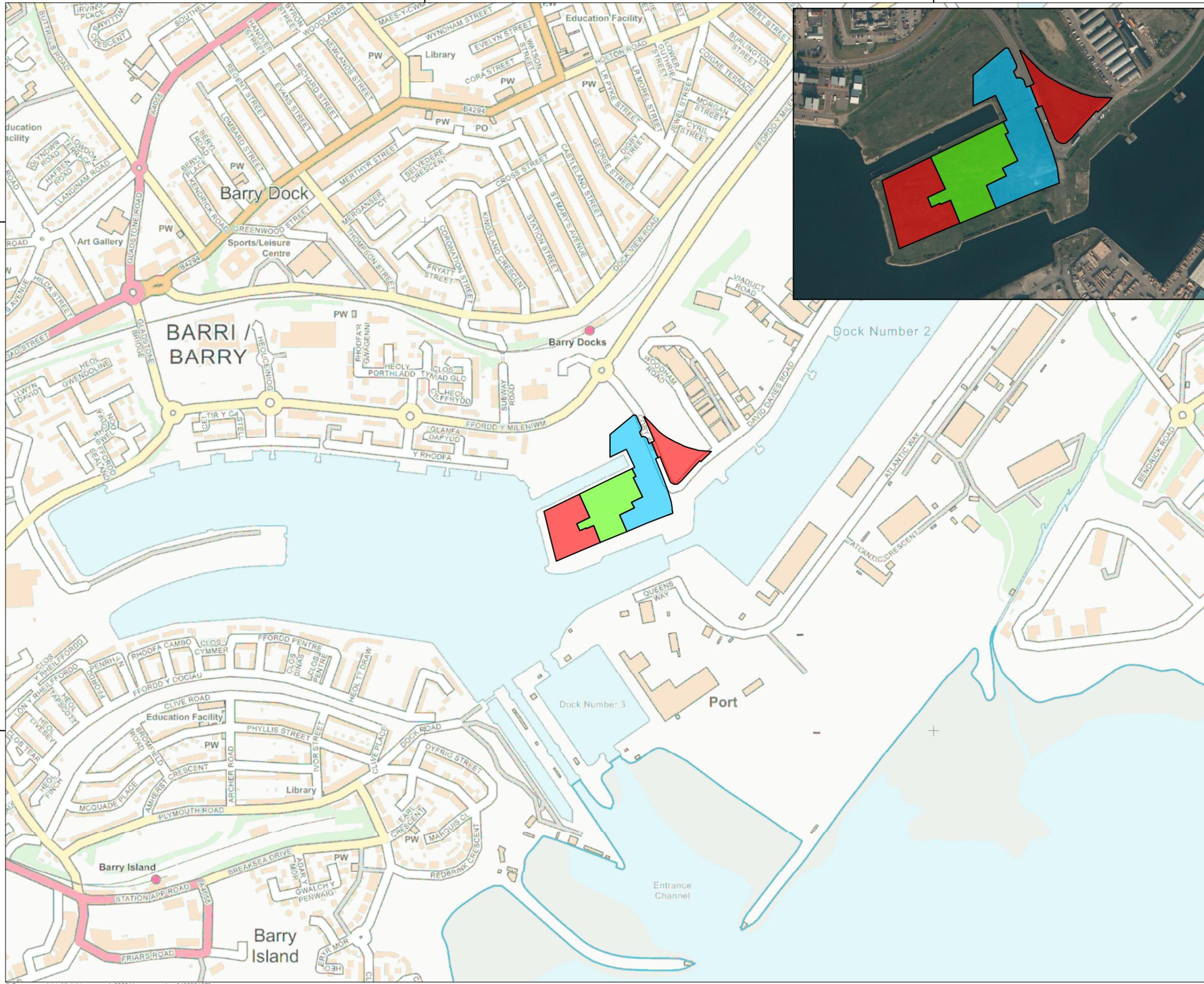
FIGURES

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- Legend:**
- Barratt David Wilson Homes
 - Persimmon Homes
 - Taylor Wimpey South Wales

Coordinate System: British National Grid
 Projection: Transverse Mercator
 Datum: OSGB 1936
 Units: Meter

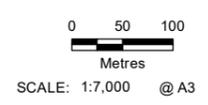


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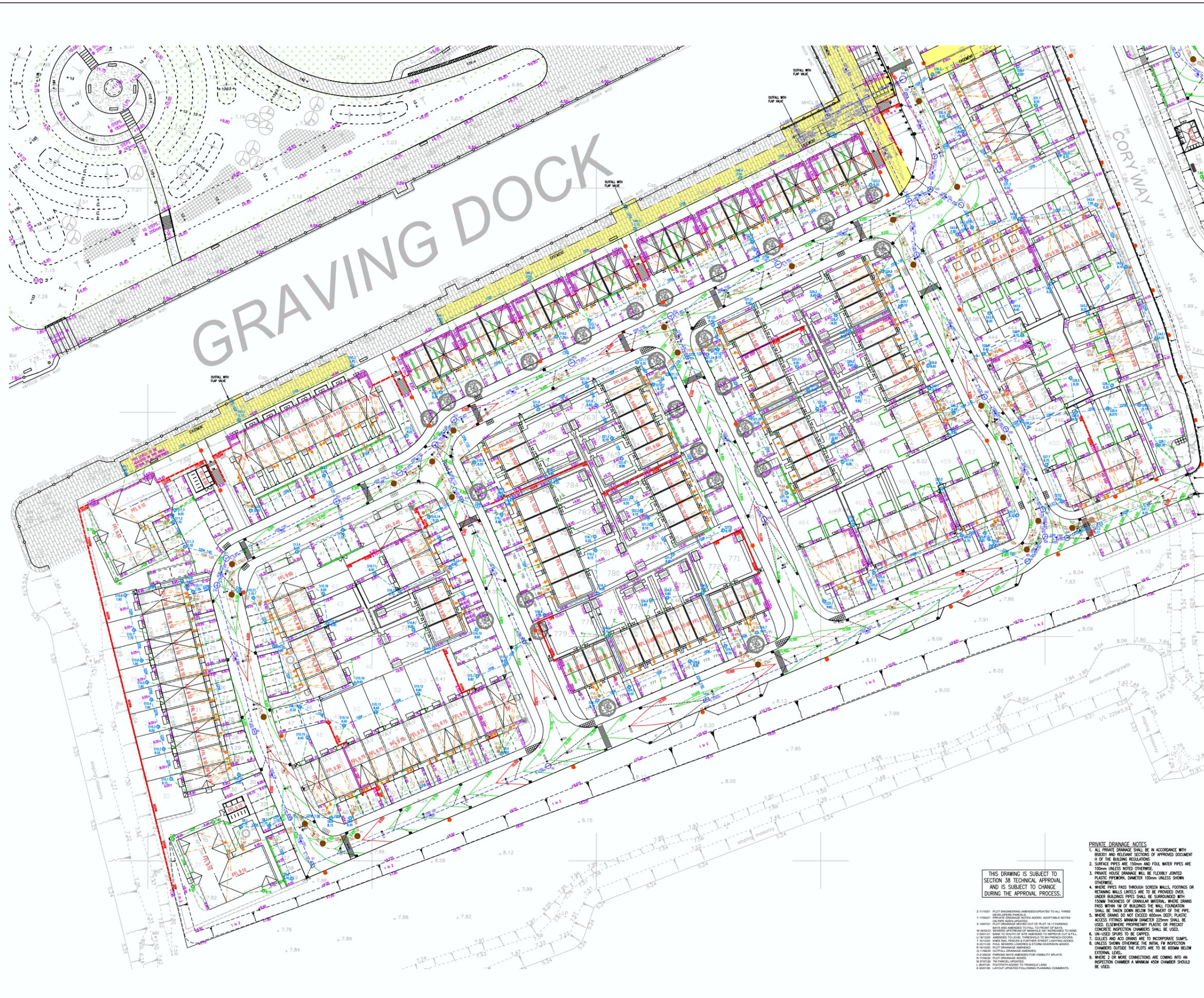
East Quay, Barry



TITLE:
**Figure 1:
 Site Location and Division of
 Land Ownership Plan**

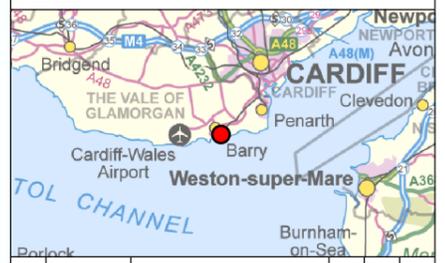


REV 00



Legend:

Coordinate System: British National Grid
 Projection: Transverse Mercator
 Datum: OSGB 1936
 Units: Meter



Rev	Date	Description	Dm	Chk	App
00	11/11/2021	First Draft	DR	AP	AP

East Quay, Barry



TITLE: 10225-100-01Z-Engineering

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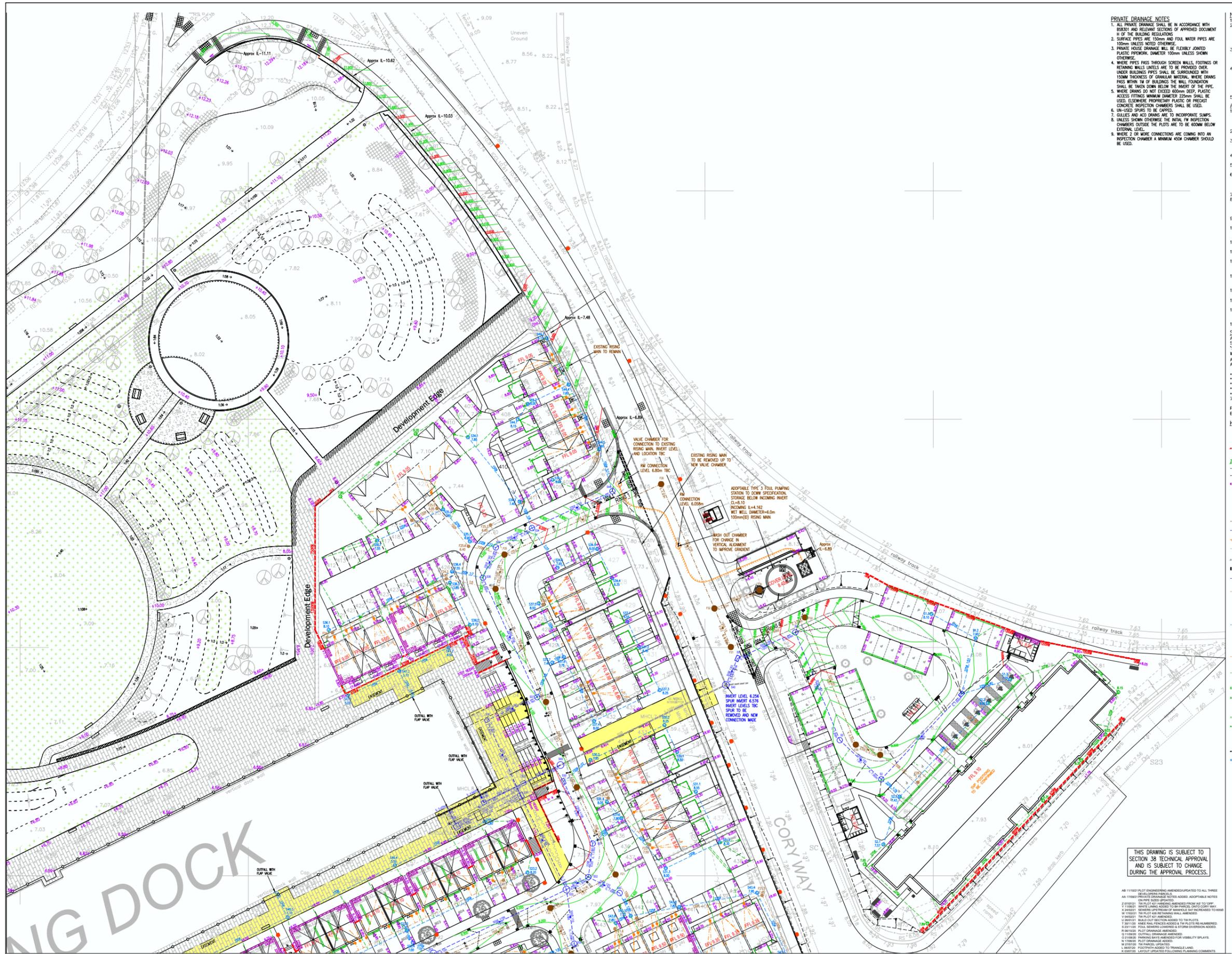
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THIS DRAWING IS SUBJECT TO SECTION 38 TECHNICAL APPROVAL AND IS SUBJECT TO CHANGE DURING THE APPROVAL PROCESS.

- PRIVATE DRAINAGE NOTES**
1. ALL PRIVATE DRAINAGE SHALL BE IN ACCORDANCE WITH BS8001 AND RELEVANT SECTIONS OF APPROVED DOCUMENT 14 OF THE BUILDING REGULATIONS.
 2. SURFACE PIPES ARE 150mm AND FOUL WATER PIPES ARE 100mm UNLESS NOTED OTHERWISE.
 3. PRIVATE HOUSE DRAINAGE WILL BE FLEXIBLY JOINTED PLASTIC PIPEWORK DIAMETER 100mm UNLESS SHOWN OTHERWISE.
 4. WHERE PIPES PASS THROUGH SCREEN WALLS, FOOTINGS OR RETAINING WALLS UNITS ARE TO BE PROVIDED OVER UNDER BUILDINGS PIPES SHALL BE SURROUNDED WITH 150MM THICKNESS OF GRANULAR MATERIAL. WHERE DRAINS PASS WITHIN 1M OF BUILDINGS THE WALL FOUNDATION SHALL BE TAKEN DOWN BELOW THE INVERT OF THE PIPE.
 5. WHERE DRAINS DO NOT EXCEED 600mm DEEP, PLASTIC ACCESS FITTINGS MINIMUM DIAMETER 225mm SHALL BE USED. EXTERNALLY PROPRIETARY PLASTIC OR PRECAST CONCRETE INSPECTION CHAMBERS SHALL BE USED.
 6. UN-USED SPACES TO BE CAPTED.
 7. CALLIES AND AOD DRAINS ARE TO INCORPORATE SIMPS.
 8. UNLESS SHOWN OTHERWISE THE MINIMUM INSPECTION CHAMBERS OUTSIDE THE PLOTS ARE TO BE 600MM BELOW EXTERNAL LEVEL.
 9. WHERE 2 OR MORE CONNECTIONS ARE COMING INTO AN INSPECTION CHAMBER A MINIMUM 450M CHAMBER SHOULD BE USED.



- PRIVATE DRAINAGE NOTES**
1. ALL PRIVATE DRAINAGE SHALL BE IN ACCORDANCE WITH BS5101 AND RELEVANT SECTIONS OF APPROVED DOCUMENT 4 OF THE BUILDING REGULATIONS
 2. SURFACE PIPES ARE 150mm AND FOUL WATER PIPES ARE 100mm UNLESS NOTED OTHERWISE
 3. PRIVATE HOUSE DRAINAGE WILL BE FLEXIBLY JOINTED PLASTIC PIPING, DIAMETER 100mm UNLESS SHOWN OTHERWISE
 4. WHERE PIPES PASS THROUGH SCREEN WALLS, FOOTINGS OR RETAINING WALLS UNLESS ARE TO BE PROVIDED OVER UNDER BUILDINGS PIPES SHALL BE SURROUNDED WITH 150MM THICKNESS OF GRANULAR MATERIAL, WHERE DRAINS PASS WITHIN 1M OF BUILDINGS THE WALL FOUNDATION SHALL BE TAKEN DOWN BELOW THE INVERT OF THE PIPE
 5. WHERE DRAINS DO NOT EXCEED 600mm DEEP, PLASTIC ACCESS FITTINGS MINIMUM DIAMETER 225mm SHALL BE USED, OTHERWISE PROPRIETARY PLASTIC OR PRECAST CONCRETE INSPECTION CHAMBERS SHALL BE USED
 6. UN-USED SPURS TO BE CAPPED
 7. GULLIES AND A/C DRAINS ARE TO INCORPORATE STAMPS, UNLESS SHOWN OTHERWISE, THE INITIAL IN INSPECTION CHAMBERS OUTSIDE THE PLOTS ARE TO BE 600MM BELOW EXTERNAL LEVEL
 8. WHERE 2 OR MORE CONNECTIONS ARE COMING INTO AN INSPECTION CHAMBER A MINIMUM 450W CHAMBER SHOULD BE USED

Legend:

Coordinate System: British National Grid
 Projection: Transverse Mercator
 Datum: OSGB 1936
 Units: Meter



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East Quay, Barry



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APPENDIX A SITE-SPECIFIC SURFACE WATER MANAGEMENT PLAN



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

East Quay, Barry

Surface Water and Silt Management Plan

302300 046 R01 (00)

NOVEMBER 2021

RSK GENERAL NOTES

Project No.: 302300 046 R01 (00)

Title: Surface Water and Silt Management Plan – East Quay, Barry

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

Date: November 2021

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Status: Final (Rev 00)

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Date:	<u>November 2021</u>	Date:	<u>November 2021</u>

Project manager	<u>Andrew Przewieslik</u>	Quality reviewer	<u>Mel Rowley</u>
			
Signature	_____	Signature	_____
Date:	<u>November 2021</u>	Date:	<u>November 2021</u>

RSK Environment Limited (RSK) has prepared this report for the sole use of the client, showing reasonable skill and care, for the intended purposes as stated in the agreement under which this work was completed. The report may not be relied upon by any other party without the express agreement of the client and RSK. No other warranty, expressed or implied, is made as to the professional advice included in this report.

Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

No part of this report may be copied or duplicated without the express permission of RSK and the party for whom it was prepared.

Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

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Figure 2	Proposed storm drainage system
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APPENDICES

Appendix A	Service constraints
Appendix B	Site photographs
Appendix C	Installation Examples
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1 INTRODUCTION

RSK Environment Limited (RSK) was commissioned by Taylor Wimpey (South Wales) Ltd on behalf of the consortium members (the clients) including Persimmon Homes Ltd (PHL) and Barratt David Wilson Homes Ltd (BDW) to produce a surface water and silt management plan (SWSMP) for the development at East Quay, Cory Way, Barry, South Wales, CF63 4JE. A site location plan is presented as **Figure 1**.

This site-specific SWSMP has been developed to outline the mitigation measures and water/silt management strategies that will be applied during the development of the site. The mitigation measures are applicable to the stage of development observed during the site inspection in November 2021.

This document must be considered by the Principal Contractor as a 'living' document and must be regularly reviewed and amended as necessary to reflect the site-specific changes as the build phase progresses or should unexpected conditions be encountered during the development work. This re-assessment should be undertaken on no less than a quarterly basis or when significant development milestones are reached.

The document has not been prepared for specific discharge of planning conditions.

This report is subject to the RSK service constraints given in **Appendix A**.

1.1 Site Details

The site is located on 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 are understood to have been removed, with ground conditions remediated to a level suitable for residential end use.

The site is split between three consortium members including Taylor Wimpey, PHL and BDW, with each company responsible for building out their own development plot. 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 division of the site ownership is presented as **Figure 3**. It is understood that all three consortium members are equally responsible for the associated infrastructure including storm drainage and associated outfalls to surface water.

The wider development area is of approximately 5.5Ha in area northern development parcel of site is approximately 4.3Ha in area and is centred at national Grid Reference ST 12377 67460.

The site forms 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. Further docks are located west 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 a second smaller parcel of the site is located and owner by BDW.

Table 1 describes the site surroundings. A photographic record of the site visit is included in **Appendix B**.

Table 1: Site setting – East Quay, Barry

	Boundary feature	Surrounding land use
To the north:	Undefined boundary with a large stockpile of soil (made ground) present	Ffordd y Mileniwm Road with Vale of Glamorgan Council offices beyond
To the east:	Cory Way and railway line with waste land	Commercial premises within Nissan Huts
To the south	Dock edge and open water	Commercial premises within the wider dock including timber storage
To the west:	Dock edge and open water	West Quay and residential areas

A site walkover was undertaken by RSK on the 8th November 2021.

The site compound (BDW and Taylor Wimpey) was located in the south-eastern corner of the site. The main site access road had been constructed and was located approximately 2-3m higher than the ground along the southern boundary, which is understood to be set aside for ecological purposes.

Piled foundations were evident across the central and northern parts of the site. Piling was ongoing in the northern most area within the Taylor Wimpey parcel. Ground levels along the north-western boundary alongside the Graving Dock were approximately 2-3m lower than the central area and were waterlogged/flooded. A hole beneath the Graving Dock coping at the eastern end of the dock, located within Taylor Wimpey’s parcel, was allowing water to drain from the flooded area directly into the dock. Water discharge was clean at the time.

The BDW parcel on the western end of the Easy Quay had commenced with the construction of buildings. No ongoing work was noted on the Persimmon parcel, who also had at the time of the visit, no site presence.

A large stockpile of made ground is located immediately beyond the north-western boundary (beyond Taylor Wimpey’s parcel) within an area set aside for future public open space. It is understood that this material may have resulted from the construction of the ASDA supermarket located 1km west of the site. It is also understood that this material will be removed from the site in due course.

Cory Way is located on the eastern boundary and provides two access points to the site. The northern access point, providing access to the piling area, had significant sediment

slurry at the entrance, allowing sediment to be remobilised onto the public highway. Whilst road sweepers (2No.) were active, residual silt on the highway could migrate to the highway storm drainage system and enter the dock via the nearest outfall.

Another small land parcel forming part of the wider development and under the ownership of BDW is located immediately west of Cory Way. At the time of the walkover, ongoing foul water pipe construction was evident.

It is understood that at the time of the walkover, no positive storm water connections were in place with rainwater draining to ground.

The site does not lie in a 'Designated Environmentally Sensitive Area' considered appropriate to the scope of this report.

Published British Geological Survey (BGS) geological records indicate that the site is underlain by superficial Tidal Flat deposits. The superficial deposits are underlain by the Mercia Mudstone Formation. However, given the historic industrial use, made ground is present and anticipated to be several meters in thickness. For the purposes of this report, no natural deposits are present at ground level.

Both superficial and bedrock deposits are classified as Secondary (undifferentiated) aquifer. The site does not fall within a designated groundwater source protection zone (SPZ). Given the presence of made ground infiltration to ground is likely, although waterlogged/flooded areas are present on site. It is likely that groundwater is coincident with water levels in the dock and that the dock walls leak water. Therefore discharges to ground would migrate to dock water.

The nearest surface water receptor is the dock surrounding the site to the north, west and south. The tidal barrier is located approximately 385m south of the site beyond which is the Bristol Channel.

No geoenvironmental data has been provided for review however, it is RSK's understanding that no obvious sources of contamination remain following site remediation. Based on our current understanding, this SWSMP does not further consider mitigation to address contamination.

1.2 Proposed Development & Drainage System

The site is proposed to be developed principally for residential land use, to comprise traditional residential units including apartments along with associated infrastructure, hardstanding, and areas of soft landscaping. The proposed engineer plan that shows the storm drain system is included within in **Figure 2**.

It is understood that the surface water drainage system will comprise standard highway surface water gullies across the site. These will discharge water to storm drain system with outfalls on the southern boundary of the Graving Dock. There are four outfalls on the southern boundary of the Graving Dock and a fifth on the northern boundary. No outfalls are recorded on any other site boundary. At the time of preparing this report, the storm system had no outfall to the dock.

No other above ground storm water attenuation structures (i.e. basins or swales) are proposed.

1.3 Sensitive Receptors to Silt

The primary receptors based on site conditions development progress in November 2021 were the dock to the west of the BDW parcel; and the Graving Dock to the north of the BDW, PHL and Taylor Wimpey parcels.

On-site sensitive receptors to surface water and silt are identified as follows:

- Storm drain system (not positive connection as of November 2021).
- Residents in completed phases (upon completion and occupation).
- Highways on site (once constructed and completed).

Off-site sensitive receptors to surface water and silt are as follows:

- Public highway (Cory Way) and associated storm water drains
- Dock waters including Graving Dock from site outfalls

2 PROTECTION MEASURES WITHIN ACTIVE DEVELOPMENT AREA

The following section sets out proposed mitigation to address potential risks at the current phase of development. This should be reviewed no later than February 2022 unless significant changes occur that warrant earlier re-assessment.

The following protection measures will be implemented on all consortium member parcels (please refer to attached **Figure 3**).

2.1 Environmental permit application for the discharge of surface waters during the construction phase

It is likely that the development will require an environmental permit for the discharge of surface waters during the construction phase. It is an offence to discharge contaminated water (including those affected by silt) to surface waters. All surface water discharge must be clean and free of contaminants. NRW require under Regulation 38 of the Environmental Permitting (England and Wales) Regulations, 2010, that all surface water discharge on an active construction site, including surface water flow and rainfall, be discharged under an environmental permit.

It is therefore recommended that an environmental permit is applied for on behalf of the development. It is noted that the permit determination period is four months from receipt of all final application materials.

2.2 Current construction condition/phase (November 2021)

The following measures should be implemented as a minimum and are shown on **Figure 3**:

BDW parcel (west):

- The BDW parcel at its western edge, slopes down to the west and the dock edge. Currently, no protection is present to prevent surface water run off directly into the dock. Surface waters could therefore wash sediment into the dock in an uncontrolled setting or silt entrained within surface water run off could enter the dock. A silt fence and/or supported by an earth bund should be installed along the western boundary of the parcel as shown on **Figure 3**. Installation examples are given in **Appendix C**.
- The northern boundary adjoining the Graving Dock had waterlogged/flooded ground. The height of the coping stones adjoining the dock ranged between 10cm and 30cm above the flood water and there was no immediate risk of this water from overtopping and entering the dock. However, should prolonged rainfall occur, then it is feasible that the flood water would rise, increasing the ponding and presenting a risk from overtopping. It is suggested that a silt fence or bund is installed along the northern boundary, however, this needs to be continuous along the entire northern length of the Graving Dock and therefore its installation needs to be undertaken in conjunction with PHL and Taylor Wimpey on their land parcels to form a single and continuous silt fence/bund along the northern development area boundary as presented on **Figure**

3. Liaison between the consortium members for this activity will be necessary. The work should also be undertaken with the minimal disturbance of sediment in the flooded area to prevent its remobilisation to the dock. The flooded area is in direct continuity with dock water via a small hole at the eastern end of the Graving Dock.

- The southern boundary has been set aside for ecological mitigation and is fenced off with herras fencing. This undisturbed ground should remain undisturbed as it forms a good buffer zone between the development edge and the dock to prevent surface water and silt migration.
- All road gully's need to be inspected. Where gully protection is missing, new bags should be fitted. Regular monitoring and maintenance of the storm drain system, including gully's needs to be undertaken to avoid excess sediment from becoming entrained within the drainage system, which could then at the point of commissioning be flushed into the dock. To ensure reduced volumes of fine particulates entering the drainage system (through the gully bag), regular road sweeping will be required.

BDW parcel (east):

- The site entrance off Cory Way had significant sediment remobilisation to the highway as a result of ongoing machine tracking and operations. Should this be ongoing in the medium term, improvement to the site entrance will be required including the placing of hardstanding. This will reduce sediment remobilisation onto the highway and the spread of suspended solids to the highway storm drain system.

PHL parcel:

- No ongoing construction work was evident on the PHL parcel.
- The northern boundary adjoining the Graving Dock had waterlogged/flooded ground. The height of the coping stones adjoining the dock ranged between 10cm and 30cm above the flood water and there was no immediate risk of this water from overtopping and entering the dock. However, should prolonged rainfall occur, then it is feasible that the flood water would rise, increasing the ponding and presenting a risk from overtopping. It is suggested that a silt fence or bund is installed along the northern boundary, however, this needs to be continuous along the entire northern length of the Graving Dock and therefore its installation needs to be undertaken in conjunction with BDW and Taylor Wimpey on their land parcels to form a single and continuous silt fence/bund along the northern development area boundary as presented on **Figure 3**. Liaison between the consortium members for this activity will be necessary. The work should also be undertaken with the minimal disturbance of sediment in the flooded area to prevent its remobilisation to the dock. The flooded area is in direct continuity with dock water via a small hole at the eastern end of the Graving Dock. Installation examples are given in **Appendix C**.
- The southern boundary has been set aside for ecological mitigation and is fenced off with herras fencing. This undisturbed ground should remain undisturbed as it forms a good buffer zone between the development edge and the dock to prevent surface water and silt migration.
- All road gully's need to be inspected. Where gully protection is missing, new bags should be fitted. Regular monitoring and maintenance of the storm drain system,

including gully's needs to be undertaken to avoid excess sediment from becoming entrained within the drainage system, which could then at the point of commissioning be flushed into the dock. To ensure reduced volumes of fine particulates entering the drainage system (through the gully bag), regular road sweeping will be required.

Taylor Wimpey parcel:

- A small hole beneath the coping stone of the Graving Dock's edge is present at the dock's eastern end on the Taylor Wimpey parcel. This hole was allowing water from the flooded area along the northern edge of the site (and south of the dock) to drain into the dock. It is likely that the presence of this hole has been key to controlling flood water levels across the BDW and PHL parcels. It is therefore suggested that the hole is retained to allow the floodwater to drain, however, this location presents a key risk area should the flood water become contaminated with silt. The hole is also located close to an area of active construction and machine tracking on the Taylor Wimpey site. It is recommended that silt protection (similar in specification to headwall protection) and consisting of hay bales and silt fencing is installed at the hole. This will allow continued draining of the flood water and reduce the potential for disturbed silts from directly entering the dock. This location is shown on **Figure 3** and **Appendix B**.
- To prevent active construction work and machine tracking from remobilising silt or silt contaminated surface water to the flood water area and the hole beneath the coping, it is recommended that an earth bund is extended alongside the access track in this area as shown on **Figure 3**. The earth bund should aim to isolate the working area from the flood water ponding areas.
- The stockpiled soils north/north-west of the site present a potential risk for silt contaminated run off to enter the northern edge of the Graving Dock. A low earth bund is partially present at the base of the stockpile. However, this earth bund needs to be extended and tied into a small, vegetated bund on the western edge of the site to prevent the bund from being circumvented. The height of the existing bund should be increased to at least 450mm.
- A temporary compound has been set up by a site contractor on the north-eastern corner of the dock in support of coring activity to form the storm water outfalls into the dock. The presence of the dock means that the earth bund to prevent run off from the stockpile cannot be fully extended along the northern dock boundary. Once the contractor's compound has been removed, the earth bund shown on **Figure 3**, should be extended and the gap closed.
- The site entrance in the north off Cory Way (**Figure 3**) had significant sediment slurry and ponded water. This was allowing sediment slurry to be remobilised onto the highway and whilst road sweeping was ongoing, road sweepers are not designed to clean heavy sediment slurry contamination. The entrance should be tidied up, with sediment slurry removed. A hardstanding entrance should be installed at the first opportunity to better control road conditions.
- The eastern edge of the Taylor Wimpey parcel adjacent to Cory Way contains debris, rubbish and provides a potential for silt contaminated surface waters to leave the site boundary and enter the highway. The boundary should be tidied and if possible, a silt

fence should be installed along its length as shown on **Figure 3**. Installation examples are given in **Appendix C**.

- Whilst located on the Taylor Wimpey parcel, the spine road entrance and associated storm water gullies are the responsibility of the consortium. The first two gullies on the road were noted to be missing gully bags/protection. These need to be fitted as soon as possible to prevent sediment from becoming entrained in the storm system and all gullies along the spine road need to be inspected, fitted with protection, monitored, and maintained.

General measures:

- **Whilst there is currently no positive connection of the storm drain system to the dock, the storm drains have been installed. It is evident that some gully bags are absent and therefore sediment will have already become entrained within the storm drain itself. This was confirmed by RSK during the site inspection on the 8th November 2021 and sediment is present within the drains at the first two drains closest to Cory Way. Further sediment is likely within the wider storm network. To protect the dock during the connection process, the final manhole(s) must be bunged/closed, to ensure that sediment is not washed into the dock. These final manhole(s) should be bunged immediately, if not already. Prior to the positive connection to the outfalls, the storm drain system should be cleaned to prevent a pollution incident at the dock.**
- Bungs for the manholes should be kept on site in case of an emergency (silt or fuel spill) to allow the storm drain to be shut off at short notice.
- Provision of road sweepers on the surrounding public highway and site roads should continue. The sweeping intensity is to be continually assessed by site management teams (consortium members) and the frequency increased during periods of inclement weather and on/off site plant movement. Tipping of road sweeper wastes **must not** be allowed on site.
- Retain additional spare silt fencing and gully protection materials on site to enable deployment at short notice and to facilitate on-going maintenance of installations.
- The deployment of a vehicle washing facility if necessary. However, the wheel wash should not be located close to the entrance with the public highway, because the wash facility generates significant volumes of silt contaminated water that could migrate off site. Its location needs to be assessed at the time, based on the progress of the build phase.

2.3 General and standard construction phase mitigation measures (all sites)

In addition to the above measures, the following should also be utilised during construction works:

- The proper fitting of gully guards within all completed highway surface water gullies at the earliest convenience. A layer of geotextile (terram) could also be placed over the top of the gully guard and secured immediately beneath the metal grate cover to

prevent bulk ingress of sediment to the gully. This will also prolong the effectiveness of the gully guard itself. All gully guards to be periodically inspected and replaced / cleaned when necessary; it is recommended that this is made part of weekly site housekeeping activities and documented by the site manager or designated assistant.

- The installation of temporary hardstanding in storage areas (e.g. brick yard and mortar silo compound) and car parking to enable these to be cleaned by road sweepers.
- The installation of hardstanding areas at key points across each phase to allow 'clean' forklift access.
- The placement of hardstanding or topsoil and reseeded on unit gardens at the earliest opportunity to control surface run-off from completed areas.
- General good housekeeping of the site.
- Where required, apply scraping of the roadways using a grading bucket or agricultural brush to remove the bulk of the sediment. A road brush should then be applied to remove excess sediment and lastly a road sweeper should be applied to provide a final finish to the road surface. Road sweepers should not be used to treat heavily silt-impacted roads as the equipment is not designed to treat heavy silt burden on roads. Road sweepers should not be allowed to tip sweeper wastes on site. All sweeper wastes should be disposed of off site at a licensed waste facility. Uncontrolled tipping of road sweeper wastes on site can lead to the ingress of contamination or silt laden water into the drainage system, groundwater, and surface waters. It should be noted that it is always preferable to avoid material being deposited in the first place and the use of road cleaning equipment should be seen as a last resort if other measures (rumble strips for example) are not sufficient.
- Mortar silo's will be present on site. These are typically located at the site compound or designated storage area. Mortar silos can give rise to contamination through the mixing of construction surface water run-off with the mortar, which has a high pH (alkaline). This can lead to alkaline enriched waters entering the drainage system and making their way to surface waters and affecting wildlife. The direct ingress of mortar to the drainage system rarely occurs when managed appropriately and is not considered to be a significant risk. Silos should have a low bund formed to control run off.
- Small-scale storage of hydrocarbons (typically diesel fuel) of low volume will occur on site. The hydrocarbons are used to re-fuel heavy plant. Heavy plant also contains small volumes of hydrocarbons, lubricants, oils, and hydraulic fluids. The accidental release/spillage of fuel is a possibility. Likewise, trespassing and vandalism can result in the release of hydrocarbons. Regulations which set standards for the storage of oil are set out in the Control of Pollution (Oil Storage) (England and Wales) Regulations 2001. The regulations set standards for oil storage facilities which aim to prevent the escape of oil and the resulting risk of water pollution and damage to land and property. As a minimum, a spill kit, boom and fire extinguisher should be present at the fuel cell, with the cell placed on a drip tray.

- General chemicals including cleaning products are to be stored in the compound. They are of very low volume and used for cleaning of toilets and kitchen areas. These are unlikely to drive a significant risk through spillage/leaks at the development.

2.4 Site Personnel and Documentation

The following measures are to be implemented to increase awareness and bring existing site documentation up to date:

- Include a detailed section relating to surface water and silt protection within the site induction folder.
- Continued documented review by the site management teams of the existing site conditions in relation to this SWSMP and update the requirements on an as necessary basis.
- Undertake documented weekly site inspections and obtain support from the appointed Environmental Consultant if/when required.
- Conduct a site pre-start meeting with all relevant parties to agree methods of working to control surface water and silt management.
- Undertake additional detailed site-based awareness training (Site Briefing / Tool-Box Talk) on surface water and silt management and protection for all pertinent site staff including groundworkers. Clear guidance should be given to groundworkers on the mitigation measures discussed.

Actions reported for project personnel include:

Technical team:

- Ensure this SWSMP is communicated to the site management team and updated as necessary with any required discharge consents applied for.

Site managers:

- Ensure the measures presented within this SWSMP are implemented by the site construction contractors.
- Brief sub-contractors and site operatives on effective water management and their responsibilities.
- Undertake regular documented inspections and checks to ensure the effectiveness of the pollution prevention measures, especially before, during and after heavy rainfall events, adverse weather and during the wetter seasons (winter).
- Notify consortium company safety / environmental managers should the site be contacted by any enforcing authority and/or members of the public raising concerns over the quality of water leaving the site.
- Report any environmental incident (such as silt ingress to the unnamed surface watercourse) to an appointed environmental advisor.
- Provision of a vacuum tanker for periods of heavy rainfall to remove water from flooded areas (i.e. along Graving Dock) if at risk of overtopping.

Contractors:

- Ensure that this SWSMP is communicated to all relevant site teams and groundworkers. The requirement for surface water mitigation measures as set out in this document should be presented to the ground worker at contract tender stage, so that its requirements are fully acknowledged and incorporated into the project. The contractor needs to be aware that mitigation measures will change (type and location) as the development progresses and is not a 'fit once and forget' item associated with the build. The mitigation and its effectiveness needs to be reviewed regularly.
- Ensure appropriate water management controls are included in relevant risk assessments and method statements (RAMS), including detailed arrangements regarding increased supervision and management during adverse weather or large scale works that may result in significant silt generation/release.
- Ensure gully protection is fitted as soon as the surface water drainage system is completed and thereafter maintain the gully bags until completion of the construction phase. Immediately report to the site manager if pollution prevention measures are not in place, are damaged or ineffective.
- Contractors are to never directly over pump excavations or other silt contaminated waters to the dock or storm drainage system without pre-treatment.

2.5 Dewatering of excavations

Dewatering of excavations from footing trenches/service trenches without appropriate water treatment can result in significant pollution of controlled waters. Dewatered silt contaminated surface water should not be discharged into the surface water drainage system or directly to surface waters. The NRW Regulatory Position Statement (RPS) "Temporary dewatering of excavations to surface waters", April 2021 requires discharged water to:

- be clean water, for example clear rainwater or infiltrated groundwater which has collected in the bottom of temporary excavations.
- not result in water containing fine or coarse suspended solids (silty water) entering surface water.
- not last more than 3 consecutive months (the activity may stop and re-start but the clock does not restart) – if the activity is likely to go over 3 consecutive months then a permit must be applied for.
- be made to surface water, such as a river, stream, or the sea.
- have a method statement that minimises the risk of pollution.

The discharge must not:

- pollute surface water.
- contain any chemical dosing agents, flocculants, or coagulants.
- be from a site which is contaminated by oil, metals, hydrocarbons, solvents or pesticides or other polluting substances.
- result in the spread of non-native invasive species, parasites, or disease.

- cause flooding from surface water.
- cause erosion of the banks or bed of the receiving watercourse.
- contain concrete wash water even if it has been treated.
- contain site drainage from surface areas such as haul roads, storage or working areas.
- be from a site with naturally elevated concentrations of substances which exceed environmental quality standards.

If active pumping of water from foundation trenches is considered, care needs to be taken that water will not be discharged direct to surface water drains without prior treatment to remove silt to <25mg/L. If required, consideration to dispose of silt-contaminated water into the foul water system, which may allow up to 1,000mg/L (depending upon water company) of suspended soil should be sought. This would require approval from the local water board and there is typically up to 6 months of lead in time to obtain appropriate licences. Where dewatering of significant volumes of water is anticipated, early advice from an appointed environmental advisor should be sought.

Importantly, following three months, an environmental permit would be required for continued pumping and discharge. The statutory appraisal time for permit applications may be up to 4 months, therefore early consideration for permit application is paramount.

3 SITE MONITORING PROCEDURES AND RECORDS

The following monitoring procedures should be carried out on a regular basis by the site management teams to enable continuous review of the measures listed above. Examples of monitoring sheets are included in **Appendix D**. A comprehensive record of the effectiveness of the system should then be maintained to enable further review by any parties attending site:

- Monitoring of on site for surface water and silt run-off, main site entrance and the adjacent public highway realm. The proposed monitoring points for the current (November 2021) development phase are set out on **Figure 3**.
- Regular inspection of all gullies and manholes and conditions of the on-site roadways.
- Maintenance, cleaning and replacement of gully guards and silt fencing as required.
- All records should be reviewed on a regular basis, but advice can be obtained by the site management team at any time from an appointed Environment Consultant.
- Calls to the appointed Environmental Consultant should be made in the event of heavy rainfall breaching protective measures or silt pollution incidents being recorded.
- To enable a prompt response to changing site conditions, it is advisable to ensure a supply of straw bales, silt fencing and silt matting is readily available to implement emergency measures.

This SWSMP is intended to be a live working document to be regularly reviewed and updated as required.

FIGURES

312000

313000

168000

167000



Legend:
 Site Boundary

Coordinate System: British National Grid
 Projection: Transverse Mercator
 Datum: OSGB 1936
 Units: Meter

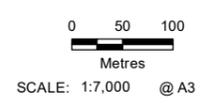


Rev	Date	Description	Drm	Chk	App
00	11/11/2021	First Draft	DR	AP	AP

East Quay, Barry



TITLE: Figure 1:
Site Location Plan



REV 00