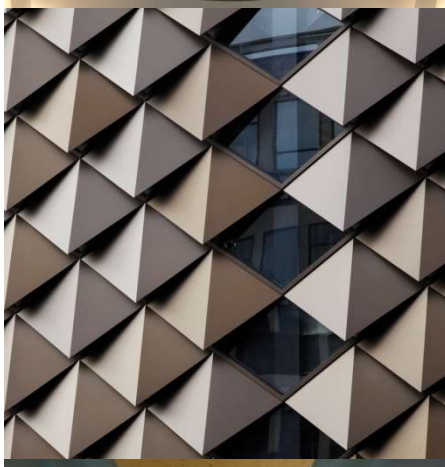

Plasterboard Manufacturing Facility

Newport Docks

FCA and SuDs Strategy

Flood Consequence Assessment and Sustainable Drainage Strategy

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Appendices

1.0 Introduction

1.1 Project Background

Curtins have been instructed by ABP to prepare a site-specific Flood Consequence Assessment (FCA) and Sustainable Drainage Strategy (SuDs Strategy) to assess the potential flood consequence that may affect the proposed facility to the south of the Newport docks off of Tom Lewis Way.

This report is based on currently available information and pre-planning discussions.

Proposals contained or forming part of this report represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project. Where such adjustments are undertaken as part of the detailed design and are deemed a material derivation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works.

Where the proposed works, to which this report refers, are undertaken more than twelve months following the issue of this report, Curtins Consulting shall reserve the right to re-validate the findings and conclusions at no cost to Curtins Consulting.

1.2 Scope of Flood Consequence Assessment

This assessment has been prepared in accordance with the Planning Policy Wales and its accompanying Technical Advice Note 15, the Interim Code of Practice for Sustainable Drainage, BS 8533-2011 Assessing and Managing Flood Risk in Development Code of Practice and the Recommended Non-Statutory Standards for Sustainable Drainage (SuDS) in Wales, the SuDs Approving Body, with site-specific advice from Natural Resources Wales (NRW), the Lead Local Flood Authority (LLFA), and the Local Planning Authority (LPA).

The assessment has:

- Investigated all potential risks of current or future flooding to the site
- Considered the impact the development may have elsewhere with regards to flooding risk
- Considered design proposals to mitigate any potential risk of flooding determined to be present
- Determine any constraints to be imposed on the development layout or drainage systems

2.0 Existing Site Details

2.1 Location and Description

The site is generally triangular tapering to the south with an area of circa 3.4 ha in total size. The site is undeveloped and covered with rough soft landscaping but with evidence of previous development including areas of asphalt and exposed foundations.

The site is bounded to the south west by the Ebbw River, to the north and east with other industrial developments and the docks to the north east.

The site is access from Tom Lewis Way which runs along the north eastern boundary of the site.

2.2 Topography

The topography of the general area surrounding the site falls in a southerly manner, down towards the Ebbw River immediately upstream of the confluence between the Ebbw, River Usk and the inlet\outlet from the docks.

A topographical survey of the site notes a high point along the north western boundary of approximately 10.3 mAOD but this batters quickly to a general boundary level around 8.9 mAOD falling to 7.8 mAOD in the western corner.

There is also an overall fall towards the south east with a level of 7.9 mAOD at the south of the site.

The overall gradient is less than 1 in 100 and relatively level apart from two small bunds which are present to the north and south.

The topographical survey is included within Appendix A.

2.3 Existing Watercourses

The site is abutting the Ebbw River to the west, and the docks are on the opposite side of Tom Lewis Way to the north east.

The River Usk runs to the east with the confluence between the Usk, Ebbw and docks inlet\outlet immediately to the south east of the site.

There are no main or minor watercourses running through the site along with no drainage ditches or other feature identified on the topographical survey.

2.4 Public Drainage

Public sewer records have not been acquired for the site, but previous investigations have not identified any public assets. Given the location within the docks the neighbouring developments have their own private foul and surface water networks and this strategy should be retained for this development.

2.5 Private Drainage

No information has been provided regarding the private drainage within the site. Whilst there are signs of previous development on the site there are no signs of private drainage infrastructure on the topographical survey.

Given the proximity of the neighbouring developments to the watercourses it is considered unlikely that any in-use private drainage runs through the site and therefore there are no constraints on the proposed development.

2.6 Site Geology

Maps provided by the British Geological Survey (BGS) show that the bedrock comprises of the Mercia Mudstone Group with superficial deposits of Tidal Flat Deposits - Clay and Silt.

The Cranfield University Soilscapes maps also describe the soils on the site as being loamy and clayey soils of coastal flats with naturally high groundwater.

Given the previous development which is evident on the site there will also be Made Ground material. This coupled with the high ground water table (due to the proximity to the watercourses and docks) infiltration technique will not be viable for the proposed development.

3.0 Planning Policy Wales

3.1 Planning Policy Wales

The PPW / TAN 15 sets out the criteria for development and flood risk by stating that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. The key definitions are:

- "areas at risk of flooding" means land within Flood Zones B and C; or land within Flood Zone A which has critical drainage problems and which has been notified to the local planning authority by the NRW; and
- "flood risk" means risk from all sources of flooding - including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

Assessments of flood risk are considered on a site by site basis relative to the type of development being proposed. As such it is the combination of probability and effects which produces the consequences of flooding which need to be appropriate for the form of development.

3.2 Flood Zone Classification (Figure 1)

Description of Zone		**Use within the precautionary framework**
Considered to be at little or no risk of fluvial or tidal/coastal flooding.	A	Used to indicate that justification test is not applicable and no need to consider flood risk further.
Areas known to have been flooded in the past evidenced by sedimentary deposits.	B	Used as part of a precautionary approach to indicate where site levels should be checked against the extreme (0.1%) flood level. If site levels are greater than the flood levels used to define adjacent extreme flood outline there is no need to consider flood risk further.
Based on Environment Agency extreme flood outline, equal to or	C	Used to indicate that flooding issues should be considered as an integral part of decision

greater than 0.1% (river, tidal or coastal)		making by the application of the justification test including assessment of consequences.
Areas of the floodplain which are developed and served by significant infrastructure, including flood defences.	C1	Used to indicate that development can take place subject to application of justification test, including acceptability of consequences.
Areas of the floodplain without significant flood defence infrastructure.	C2	Used to indicate that only less vulnerable development should be considered subject to application of justification test, including acceptability of consequences. Emergency services and highly vulnerable development should not be considered.

3.3 Flood Risk Vulnerability Category (Figure 2)

Development category	Types
Emergency services	hospitals, ambulance stations, fire stations, police stations, coastguard stations, command centres, emergency depots and buildings used to provide emergency shelter in time of flood
Highly vulnerable development	all residential premises (including hotels and caravan parks), public buildings (e.g. schools, libraries, leisure centres), especially vulnerable industrial development (e.g. power stations, chemical plants, incinerators), and waste disposal sites
Less vulnerable development	General industrial, employment, commercial and retail development, transport and utilities infrastructure, car parks, mineral extraction sites and associated processing facilities, excluding waste disposal sites

4.0 Development and Flood Risk

4.1 Proposed Development Vulnerability Category

The proposals include the construction of an industrial manufacturing facility and is therefore classified as 'Less Vulnerable Development'. As such the consequences of flooding is less significant as it does not impact on public services or impact traumatically on people's lives.

There is no residential or sleeping function of the proposals and the site will not be open to the general public. As such all persons present on the site can be trained for the correct evacuation procedures with a log of persons who are present at any given time.

4.2 TAN15 Flood Mapping

The NRW website includes mapping for Flood Zone Classifications and the site lies mainly within C2 with a small area of B to the north adjacent to Tom Lewis Way. The area of C2 extends over the docks, Ebbw River, River Usk and other areas of the developed dock to the east.

The extents of Zone B extends to the north and covers the remainder of the docks.

4.3 Justification Test

As the development lies within Zone C2 the justification test is required. The location within the docks is strategic as the main resource required for the manufacturing is gypsum as well as an existing location with good transport links for bulk materials. Gypsum is already imported and handled on the port estate and ABP Newport is able to do so pursuant to its statutory functions. Therefore, the development being sited within the docks has sustainability as well as economic benefits in a location suitable for increased HGV traffic.

The location in the docks is a key employment area for the region and will add to the function of the docks. As noted in the Local Development Plan (LDP) EM2 "The council will support such development where it can be demonstrated that the development is complementary to and does not hinder the operational use of the port."

4.4 Climate Change

In accordance with the Welsh Government advice CL-03-16 whilst the design life of the proposed development is 30-years it will have an assumed lifetime of 75 years as it is non-residential development. This figure will be used for the predicted future flood level for the development.

Additionally, upper end allowances of 40% will be used for future rainfall generation to remain conservative in the design.

4.5 Natural Resources Wales Flood Data

A flood data request was submitted to NRW and they have provided flood level results from the Caldicot and Wentlooge Coastal study, together with new updates to landform changes in the area.

The baseline model included the improved Riverside tidal defences complete in summer 2012 and the Caerleon defence improvements completed July 2016.

The model was run for undefended and defended tidal flood events for 2015 and defended tidal events with climate change. The information is contained within Appendix C.

Based on a 75 year design life the future flood level has been determined for 2094. As the mechanism of flooding is both fluvial and tidal the 1 in 200 year event is to be considered. Therefore the figures from 'Table 6: Defended Interpolated Results (2019)' give a flood level of 9.43mAOD.

As the site has been recently modelled and using the upper confidence interval a freeboard allowance of 200mm should be used and therefore a proposed minimum FFL of 9.63mAOD. This will include raising site levels under the footprint of the building to the minimum FFL and grading back suitably for the external works to achieve access and tie-ins to the existing boundary conditions.

Using the above the building will not be at flood risk up to and including the 1 in 200 year plus climate change event. This reduces the risk to low\medium given the nature of the development.

4.6 Flood Compensation

As the flood mechanism has a tidal component then any ground level raises within the site will remove flood storage area but this will not require compensation as it will have no effect on the flood level on the site and the local area. This is because ground level changes will not affect sea level as any displaced volume is spread over a large area.

4.7 Flooding from Groundwater

Given the proximity of the site to the Ebbw River, River Usk and the docks there is very low chance of groundwater build up under the site. Any groundwater emergence would also flow away from the proposed development in to the Ebbw River due to the local topography.

Because of the above, the potential risk of flooding from this source is considered to be low.

4.8 Flooding from Adopted Sewers

As there are no public sewers in the vicinity of the site there is no risk of flooding from this source.

4.9 Flooding from Private Drainage

As part of the redevelopment a new surface water drainage network will be constructed which will be designed to safely accommodate the 1 in 100 year plus climate change event.

Thus, the potential for flooding because of failure to the private drainage is considered to be low.

4.10 Flooding from Surface Water

The upstream catchment of the development is very small given the location within the docks. The proposed FFL is also higher than general site levels and therefore the overland flow paths would be away from the building. An assessment of overland flow routes has been included in Appendix F.

Because of the above risk from surface water flooding is low.

4.11 Flooding from Reservoirs, Canals and Artificial Sources

There are no canals or reservoirs near the site, and the docks are a controlled feature.

Because of the above flooding from reservoirs, canals and artificial sources is deemed to be low.

4.12 Overall Flood Consequence

As noted in the previous sections the flood risk to the proposed development is considered to be medium\low from tidal\fluvial sources and low from all others. Therefore, the site is suitable for the type of development proposed with the proposed mitigation of the FFL raised above the future 1 in 200 year level as the level of consequence meets the TAN15 criteria.

4.13 Access and Egress

The site is accessed from Tom Lewis Way which is higher than the existing site levels and located within Flood Zone B.

The mechanism of flooding has a tidal component and is therefore a longer duration and less ‘flashy’ event. Therefore, the hazard mapping contained within Appendix C needs to be taken into context with the development of the flood event. As such whilst the mapping shows a ‘risk for most’ category at the peak of the event it would build up to this over a period of time and the evacuation route to the north along Tom Lewis Way is at a ‘very low hazard’ even at the peak.

Emergency protocols, based on egress northwards on Tom Lewis Way, will be developed to manage the risk to acceptable and safe levels. These will be incorporated into the ABP’s existing docks wide Flood Evacuation Plan into which the proposals will be fully integrated.

The development should also be signed up to the NRW flood warning service to give advanced notice of potential flooding events.

4.14 Materials Storage

Due to the flood risks associated with the proposed development site at the southern end, as the levels are lower, materials will be stored offsite as part of the general dock activities.

Some materials will be present on the site, and stored within the main building, due to the manufacturing process. The bulk of the material will be gypsum which is a sea floor mineral. This material is already dredged as part of the dock activities and therefore the impact from this material during an extreme flood event on the proposed development site is small. Additionally, a silt trap and petrol interceptor is included within the proposed surface water drainage network which will capture spilt materials rather than them being washed in to the watercourses. Further details are available within the 'Plasterboard Manufacturing Facility at Newport Docks – additional information to inform EIA screening request' Ref: R/4732/01/jfo/SCH. This notes the following:

"Risks of water pollution will be managed through adherence to good practice measures, such as those described in 'Guidance for Pollution Prevention: Works and maintenance in or near water (GPP5)', to prevent/reduce the potential for accidental spillages during construction. This is further detailed in Section 3.4 of the EIA Screening Report. Such measures will be included in a Construction Environmental Management Plan (CEMP).

Gypsum, as well as other bulk mineral cargo, is already imported and handled on the port estate and ABP Newport is able to do so pursuant to its statutory functions. Measures and procedures to manage the risk of spillages are already implemented. Such measures include minimising the drop height for materials when loading/unloading, sheeting wagon movements, sweeping the quayside to collect spillages, and using dust suppression equipment where necessary. Therefore, no additional risks to water quality through accidental spillages of gypsum during operation will be introduced by the Proposed Development. Furthermore, gypsum (calcium sulphate) is a non-toxic, inert material and occurs naturally in seawater (indeed, gypsum is formed via the evaporation of seawater). It is not included in the environmental quality standards for priority substances and other pollutants used to clarify chemical status of seawater under the Water Framework Directive (specified in the Environmental Quality Standards Directive 2008/105/EC)."

5.0 SuDs Drainage Strategy

5.1 Flood Risk Constraints

The classification of the development is Less Vulnerable and the site is located in Flood Zone C2 and B. Following the Justification Test the development is appropriate for this location given the strategic location within the docks. There are therefore no specific constraints that should be imposed upon the proposed development or its drainage networks beyond the FFL set above the future 1 in 200 year plus climate change event.

5.2 Existing Public Drainage

There is no public drainage within the vicinity of the site.

5.3 Existing Private Drainage

The site is currently undeveloped with no known existing drainage.

Currently the site falls to the south west and therefore runs off directly into the Ebbw River.

5.4 Proposed Surface Water Drainage

The discharge hierarchy notes the use of infiltration as the preferred option, however the made ground under the site and proximity to the watercourse would mean that potentially contaminants would be washed into the watercourses.

The next option is a discharge into a watercourse and the site is immediately adjacent to the Ebbw River. As the river is tidal at this point then a free discharge can be used in accordance with the 'Sustainable Drainage Systems Standards for Wales' Guidance on Standard S2 paragraph G2.1:

"This Standard applies to discharges to surface water bodies, surface water sewers or combined sewerage systems. However where the surface water body is unaffected by either the discharge rate or volume of runoff (e.g. an estuary, the sea or a water body identified in the Local Flood Risk Management Strategy (LFRMS) as not needing hydraulic control of runoff to it), the hydraulic management control requirements are limited to the drainage service provisions for the site and adjacent areas that could be affected by the performance of the drainage system."

Therefore, the site surface water SuDs network has been design to accommodate the 1 in 100 year plus 40% climate change event but with an unrestricted discharge.

A non-return valve will be included on the outlet headwall to prevent backwashing of silt into the network during high water level events, but the site will still be able to discharge to the estuary.

A proposed surface water strategy drawing is contained within Appendix D.

Corresponding hydraulic calculations are included within Appendix E.

5.5 Water Quality

To incorporate soft SuDs features they would have to be within the land to the south which is more exposed to tidal flood risk, and lowering the levels to achieve the connection thus increasing the flood risk. As the flooding is tidal this would mean the soft feature being adversely affected by silt and therefore needing to be excavated and re-seeded regularly with the risk of erosion due to the sward not being fully established.

This is coupled with the high discharge rates of surface water drainage networks in the vicinity of estuarine waters due to the negligible impact of the water and this being more sustainable than large attenuation excavations which would be sent to landfill and the holes being filled with plastic material to form geocellular attenuation systems. As such the most sustainable approach is the free discharge of surface water.

Whilst desirable, the lack of viable infiltration for the proposed development prohibits the inclusion of systems which would restrict any discharge from the first 5mm of rain. This is because without infiltration as a means of disposal of the water under storm conditions it will always need to drain away from the site.

Self-draining surfaces do not concentrate the flow from a larger area to a smaller area and instead are self-draining. This is different from a soakaway which decreases the area over which water can trickle back into the ground. As such self-draining surfaces are not soakaways but are instead mimicking the natural behaviour of soft landscaping.

Therefore, for the drained areas a Class 1 full retention separator will be included within the scheme as this will trap oils and silts from the service yard.

With respect to the Simple Index Approach as detailed within the SuDs manual the use of a proprietary water quality treatment system such as noted above is acceptable without secondary features. Given the size and flow rate within the proposed surface water network additional features would be redundant and not provide additional benefit, which is therefore not sustainable to include. The SIA also does not necessitate the use of ‘stages’ of treatment as it is geared towards the use of the appropriate indices as a more quantitative approach and not the superseded SuDs Manual qualitative of stages.

5.6 Amenity\Biodiversity

As part of the development outside of the built environment it is proposed to include:

- Habitat Corridor – 0.5 ha

- Habitat Enhancement Area – 0.6 ha
- Additional Ecological Mitigation Land – 1.1 ha

As noted above the flow rates from the proposed surface water network are very high due to the free discharge and if discharged through the habitat area this would cause a significant erosion issue. To accommodate any potential connection the habitat area would also need to be lowered further within the flood risk area to achieve a physical surface water connection and storage thereby exposing the flora and fauna to more frequent inundation and disruption to the habitat. Based on the sustainability of higher discharge rates, reduced earthworks, and the potential detriment to the habitat area the amenity\biodiversity areas have been separated from the drainage network but are still present within the scheme. In this way a more appropriate development has been proposed rather than a compromise for the sake of duality.

5.7 Proposed Foul Water Drainage

No public foul sewers are present within the docks and therefore the proposed point of discharge is the Ebbw River via a package treatment plant.

The process for manufacturing is a closed system and does not produce effluent which would run through the foul system. Therefore the only effluent being processed would be domestic equivalent and suitable for a standard package treatment plant.

The outfall from the treatment plant would be shared with the surface water outfall from the site as shown on the drainage strategy drawing in Appendix D.

5.8 Maintenance

As the drainage network is private and only serves the development and within the docks it would not be appropriate for it to be managed by the sewerage undertaker or the SAB. As such the foul and surface water network will be privately maintained.

The petrol interceptor will include telemetry to indicate when it is getting full for emptying and will be on a regular maintenance schedule as recommended by the manufacturer of the proprietary unit.

The package treatment plant will also include telemetry to indicate that it is functioning correctly and will be on a regular maintenance schedule as recommended by the manufacturer of the proprietary unit.

The remaining drainage is traditional pipes and manholes which will only require intermittent inspection and after heavy rainfall events.

The headwall and non-return valve will also need inspection after high water level within the Ebbw River to ensure it is free flowing and clear of potential blockages.

In relation to the Welsh Government Statutory Standards for SuDs S6 rationale above has been provided in terms of the sustainability of discharge rates and therefore not using soft features. The other aspect of this is that the potential flow rate is high and the depth and size of a large feature would either be prohibitive to the development or reduce the quality and\or size of the amenity and biodiversity areas being proposed due to the required features to reduce scour and erosion with the higher flow rates.

There are very high flow rates proposed in the scheme and therefore there is a strong CDM issue to be considered on the use of open hard features which overrides the desire of S6 in producing a safe and sustainable scheme.

6.0 Summary and Conclusions

6.1 Flood Consequence

As determined within Section 4 the flood risk to the development is medium from fluvial\tidal sources and the site is within Flood Zone C2 and B.

The classification of the development is Less Vulnerable, and given the Justification Test proving the suitable location of the proposals, along with the mitigation of setting the FFL at 9.63mAOD above the future 1 in 200 year plus climate change flood level the development is suitable given the acceptable consequences. This increases levels under the footprint of the building from 7.60-9.00mAOD to the 9.63mAOD FFL.

The development should also be signed up to the NRW flood warning service to give advanced notice of potential flooding events.

The residual risk to the development from flooding is medium\low as events with a lower probability than the 1 in 200 year would still expose the development to flooding, however with the mitigation of the raising of ground levels and the flood warning and on-site management proceeding this is considered acceptable for this form of development.

Egress from the site will be northwards via Tom Lewis Way with specific procedures integrated in to the ABP's existing docks wide Flood Evacuation Plan.

6.2 Drainage Strategy

No specific constraints to the proposed drainage systems have been determined by this report.

A climate change allowance of 40% should be included for in the design of surface water drainage proposals across the range of storm durations for the 1 in 100 year events.

Surface water will be freely discharged into the Ebbw River as it is unaffected by either the discharge rate or volume of runoff adjacent to the site.

The manufacturing process is closed system and does not require discharge. Therefore, the only generated flows are domestic equivalent and will be treated by a package treatment plant and discharged to the Ebbw River.

Appendices

Appendix A - Topographical Survey

Appendix B - Proposed Layout

Appendix C - NRW Flood Information

Appendix D - Drainage Strategy Drawing

Appendix E - Surface Water Drainage Calculations

Appendix F - Overland Flow Drawing

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