APPLICATION FOR AN ENVIRONMENTAL PERMIT VARIATION UNDER THE ENVIRONMENTAL PERMITTING (ENGLAND AND WALES) REGULATIONS 2016 (AS AMENDED)

APPLICATION REFERENCE PAN-024288

NOT DULY MADE RESPONSE – CONTAINMENT RISK ASSESSMENT FOR POLLUTION PREVENTION

PB LEINER
The Clear Solution

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ACRONYMS / TERMS USED IN THE TEXT

CIRIA	**Construction Industry Research and Information Association**
CSR	**Containment System Review**
Chemiguard	**Chemiguard Unit**
EPRP	**Emergency Preparedness and Response Plan**
ETP	**Effluent Treatment Plant**
GPR	**Glass Reinforced Plastic**
NRW	**Natural Resources Wales**
PB Gelatins UK Limited	**PB Gelatins**
SAP	**Systems, Applications and Products in Data Processing**
The Installation	**PB Gelatins Gelatin Manufacturing Site**

1. INTRODUCTION

1.1. Overview

1.1.1. As part of the Natural Resources Wales ("NRW") Not Duly Made Request for Information Letter (dated 22nd September 2024) related to P B Gelatins UK Limited ("PB Gelatins") Permit variation (application reference PAN-024288), a Containment Risk Assessment was requested:

"Containment Risk Assessment

We need you to provide a risk assessment to assess primary, secondary and where relevant tertiary containment measures following the source, pathway, receptor model as outlined in Containment Systems for the prevention of pollution' (CIRCIA C736). The assessment should clearly demonstrate what tanks are proposed as part of the variation that will contain potentially polluting liquids, the capacities of these tanks and the capacities of any secondary containment proposed.

The assessment should also consider the suitability of the containment proposed during a flood event as your site is located within a flood risk zone."

1.1.2. Consequently, this document has been prepared to detail the containment systems for pollution prevention in accordance with CIRIA C736 to demonstrate how the proposals detailed in the variation will comply.

1.1.3. Secondary containment minimises the consequences of a failure of the primary storage by preventing uncontrolled spread of potentially polluting substances, referred to as an inventory. CIRIA states that relatively small proportion of incidents occur directly from catastrophic failure of tanks or vessels. Tertiary containment can also be in place as an additional level of protection such as containment from kerbing or use of flexible booms in the case of escape of liquid from the secondary containment.

1.1.4. The Containment System Review ("CSR") is structured as follows:

- risk assessment and classification of systems;
- secondary containment selection and capacity; and
- design and performance and maintenance of selected bunding.

2. RISK ASSESSMENT AND CLASSIFICATION OF SYSTEMS

2.1. Source-Pathway-Receptor Model

2.1.1. A risk assessment based on the source-pathway-receptor model has been undertaken to assess the likelihood and consequences of loss of containment in the absence of any containment.

2.1.2. The general framework involves:

- Step 1 – establishing a site hazard rating;
- Step 2 –establishing site risk rating; and
- Step 3 – applying the site risk rating to select the appropriate class of containment.

2.1.3. The outcome of the assessment supporting a three-tier based classification system for containment has been used to develop the containment strategy based on the hazard of the inventory and the sensitivity of potential receptors should spillage occur. The containment strategy involves prevention (containment) as well as mitigation measures.

Table 1: Site Hazard Rating

Source (pose a hazard to environment if released)	Description	Source Hazard Rating	Pathway	Pathway Hazard Rating	Receptor	Receptor Hazard Rating	Overall Site Hazard Rating
Inventory of untreated A21 wastewater/effluent	Wastewater from A21 processing activities.	Moderate	Overland flow Via Drainage network	Moderate	Soils and groundwater - areas not benefitting from impermeable surfacing Welsh Water Treatment Plant and subsequent watercourse. Surface water drainage – River Taff	Moderate	Moderate
Inventory of externally stored chemicals	Sodium hydroxide Hydrogen chloride Hydrogen peroxide Sodium chloride/brine solution						
Rainwater / flood water contaminated by external storage inventory	Potentially mixed with above inventory						
Fire-fighting agents contaminated by inventory	Any of the above and contaminating firefighting agents						

Table 2: Site Risk Rating

Events Could Lead to Loss of Containment	Controls	Likelihood of Occurrence	Overall Site Risk Rating
Operational and/or Structural Failure	New plant and storage vessels purchased that have been manufactured conforming to relevant standards. Automated systems so human failure by operators is unlikely.	Low	Moderate – design of the containment system should be an intermediate degree of integrity.
Shortfalls in Design	Alarm system is in place to alert of issues or failures with storage vessels and equipment.		
Abuse	Change of use procedure must be followed to prevent inappropriate change of use. Training of personnel.		
Impact from Vehicle	Barriers and kerbing to prevent impact		
Flooding	Use of integral bunding where possible. Flood alert monitoring. Periodic removal of rainfall from bunds were stored externally.	Low/Moderate	
Vandalism	Closed circuit television, security lighting, lockable gates, security and patrols.	Low	
Fire	Ignition sources kept away from storage vessels. Fire Risk Assessments undertaken annually.	Moderate	

3. SECONDARY CONTAINMENT SELECTION AND CAPACITY

3.1. Local Containment Systems

3.1.1. Following completion of the risk assessment, PB Gelatins considered integral secondary bunding and secondary local containment systems zone by zone was the most robust containment design so that the inventory could be captured at the source of the failure.

3.1.2. Local containment systems have the highest relative reliability as they are usually the simplest system, they do not rely on operation of valves or intervention during an incident, maintenance is relatively easy, all parts are accessible and major defects and obvious leakage from the primary container into the bund can be easily detected.

3.1.3. There are three main zones at the Installation regarding containment systems proposed as part of the variation;

- external untreated effluent storage;
- external chemical storage for effluent treatment; and
- sodium chloride/brine storage.

3.1.4. PB Gelatins has applied the minimum containment requirement of 110% of the capacity of the largest tank or 25% of the total capacity of all the tanks within the bund, whichever is the greater.

3.1.5. A breakdown of the tank capacities and bund capacities proposed is provided Table 3. It can be demonstrated that the proposed tank bunding conforms to CIRIA C736.

3.1.6. Table 3 below supersedes Table 5 in the Environmental Permitting Technical Requirements Document (PBGE.01.09_EPTR Issue 1) in relation to maximum storage quantities.

Table 3: Storage Vessels and Secondary Containment Capacities

Vessel	Vessel Volume (m^3)	Quantity	Total Volume (m^3)	Secondary Containment Bund Type	Secondary Containment Bund Capacity (m3)	% Secondary Containment
Untreated A21 effluent tank	30	1	30	Subsurface concrete containment bund	108	232
Settling tank for balancing of A21 effluent	400	1	400	Integrally bunded	447	111.75
Sodium Hydroxide	10.5	1	10	Integrally bunded	12	110
Hydrogen Chloride	1	1	10	IBC Drip Tray Bund	1.1	110
Hydrogen Peroxide	15	1	15	Integrally bunded	16.5	110
Sodium Chloride/Brine Solution	37	1	37	Glass Reinforced Plastic ("GRP")	40.7	110

3.1.7. Each zone is discussed in turn to detail the storage and bund arrangements at the Installation.

External Untreated Effluent Storage

3.1.8. The A21 effluent pumping chamber is a concrete form tank and exceeds the 110% capacity required for secondary containment. It has an effluent storage retention time of approximately 8 hours, and benefits from an aeration system, before being pumped using above ground centrifugal pumps through an in-line static mixer for pH correction. The pumps and static mixer will be located within a kerbed concrete area connected to the pumping station.

External Chemical Storage for A21 Effluent Treatment Plant ("ETP")

3.1.9. The site has several chemical storage facilities. The site has replaced all tanks at the end of their life expectancy. Most tanks have been built with their own bunded system which is integral. The pipework and pumps feeding the process from the tanks also have been updated with a Chemiguard system.

3.1.10. All site tanks, bunds, Chemiguard[1] units and tertiary containment is inspected weekly and recorded on the site SAP system. External integrity inspections are carried out annually.

Sodium Chloride/Brine Storage

3.1.11. The Brine Tank is a Glass Reinforced Plastic ("GRP") tank designed with a small lid on a large cover making it more convenient for the user to put salt in. The salt well in the tank is extended upward to the top of the large cover so that the effective capacity of the salt solution is increased by over 15%.

3.1.12. New exterior design and precise mould meaning the quality and integrity of product has been greatly improved.

Tertiary Containment

3.1.13. External uncovered secondary containment bunds are to be inspected daily for rainwater and emptied immediately following any rainfall event. Therefore, the rainfall within the bund shall not jeopardise the available capacity within the bund. Both external bunds have also been designed to hold more than the 110% or 25% capacity rule.

3.1.14. It should also be noted that PB Gelatins drainage in the A21 ETP area is directed to the ETP and will not enter surface water. The ETP can be isolated from the foul sewer network and a buffer capacity of 8 hours is available. Therefore, any spill can be captured and will not be released or escape the Installation.

3.1.15. It is stated in the CIRIA guidance that it would normally be impracticable to design the local

[1] https://www.chemresist.com/chemiguard/ , accessed October 2024

containment with sufficient capacity to contain firefighting and cooling water used in a major fire as higher/greater bund walls cause construction, operational and safety problems and hinder the ability to fight fires. PB Gelatins will also consult with the Fire Rescue Service to determine if cooling water can be recirculated.

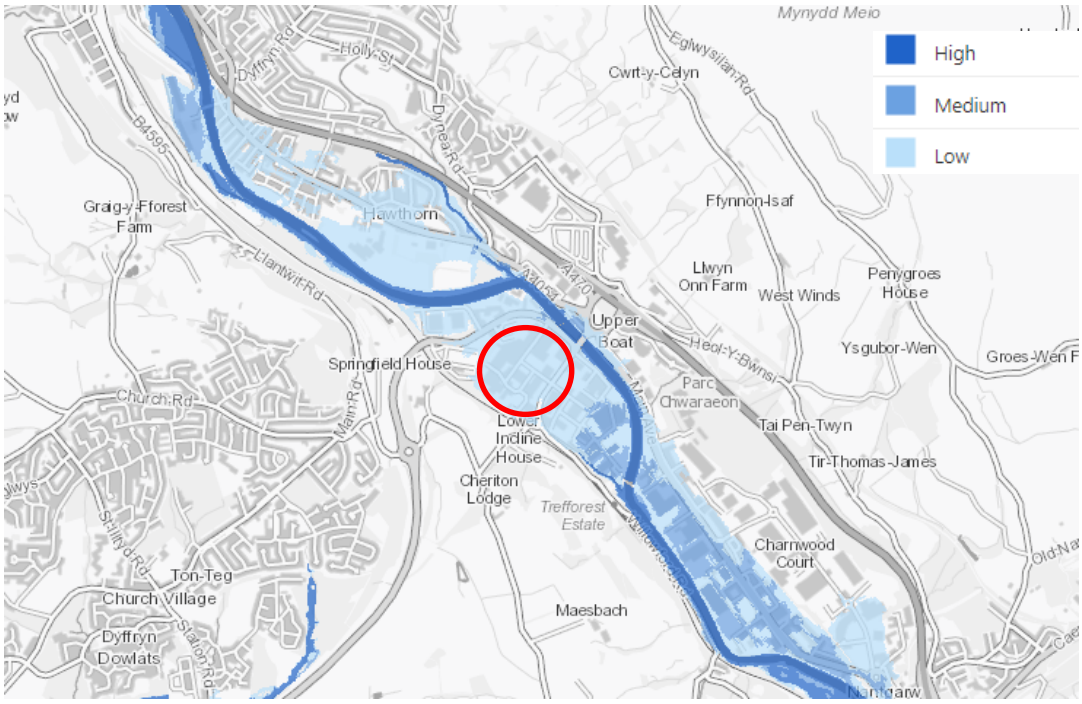
3.1.16. In accordance with the CIRIA guidance, PB Gelatins have introduced a 100mm freeboard to external uncovered bund areas. In addition to this, PB Gelatins is committed to introducing an additional 250mm for surge allowance.

Flooding Consideration

3.1.17. The nearest watercourse is the River Taff which is located approximately 0.02km north from the Installation boundary at its nearest point.

3.1.18. As shown on the NRW Long Term Flood Risk Map[2] provided in Figure 1, the Installation is at low risk of flooding from rivers and seas. Low risk is defined as having 0.1% to 1% chance of flooding from rivers or seas annually.

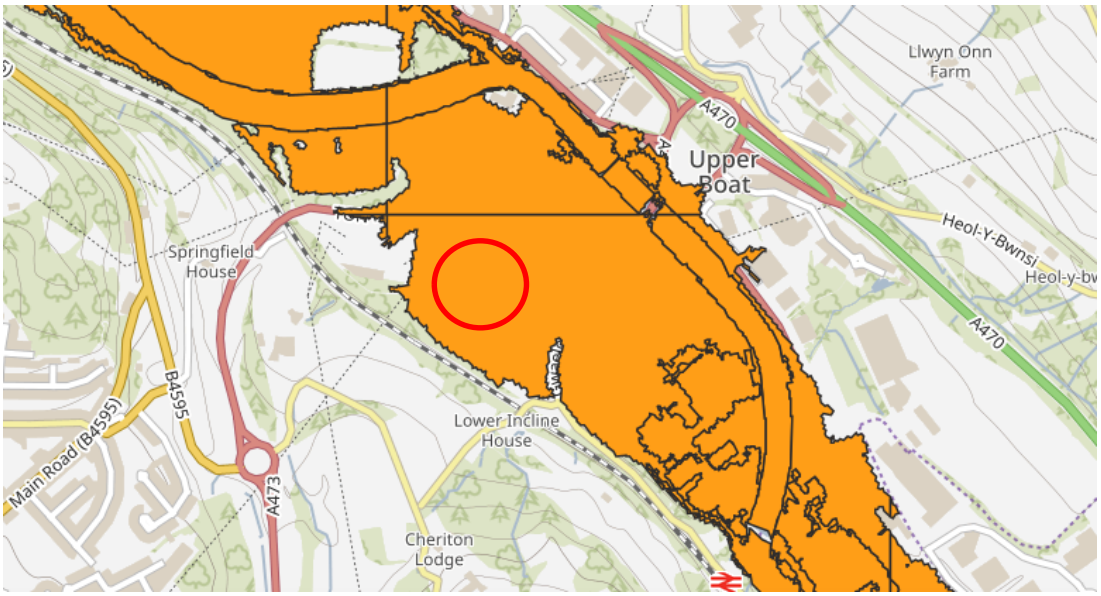
Figure 1: Long Term Flood Risk Map – Rivers and the Sea



[2] NRW Long Term Flood Risk maps, available at: https://naturalresources.wales/flooding/check-your-flood-risk-on-a-map-flood-risk-assessment-wales-map/?lang=en. Accessed July 2023.

3.1.19. This accords with the Flood Risk Assessment Wales mapping tool on DataMap Wales[3] as shown in Figure 2. The Installation is shown to be at low risk of flooding from rivers and seas.

Figure 2: Flood Risk Assessment – Flood Risk from Rivers and Seas



[3] https://datamap.gov.wales/layergroups/inspire-nrw:FloodRiskAssessmentWales, accessed September 2024

3.1.20. As demonstrated in Figure 3 and 4, due to the layout of the Installation consisting of discrete areas, there are a range of risk levels for flooding from surface water and small watercourses across the Installation. Most areas possess a low risk of flooding annually (0.1% - 1%).

3.1.21. There are discrete areas on the Permit boundary of the New Farm and Old Farm permitted areas which possess a high risk of flooding from surface water and small watercourses where high risk is defined by NRW as greater than 3.3% chance of flooding each year.

Figure 3: Long Term Flood Risk Map – Surface Water and Small Watercourses

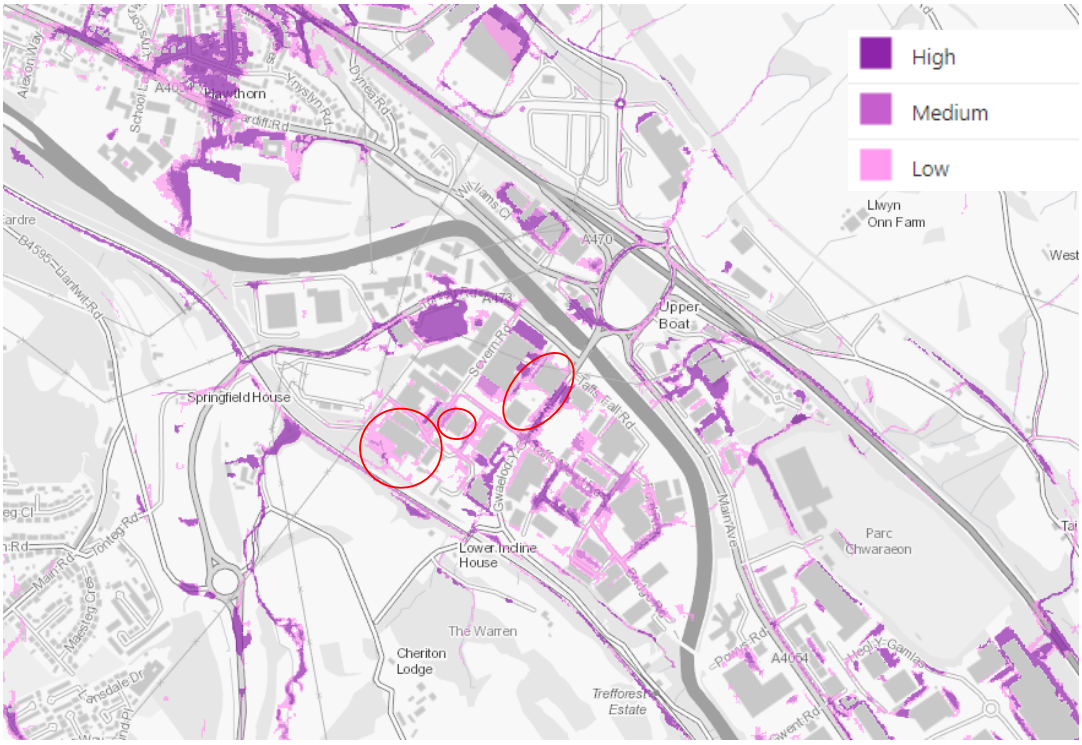
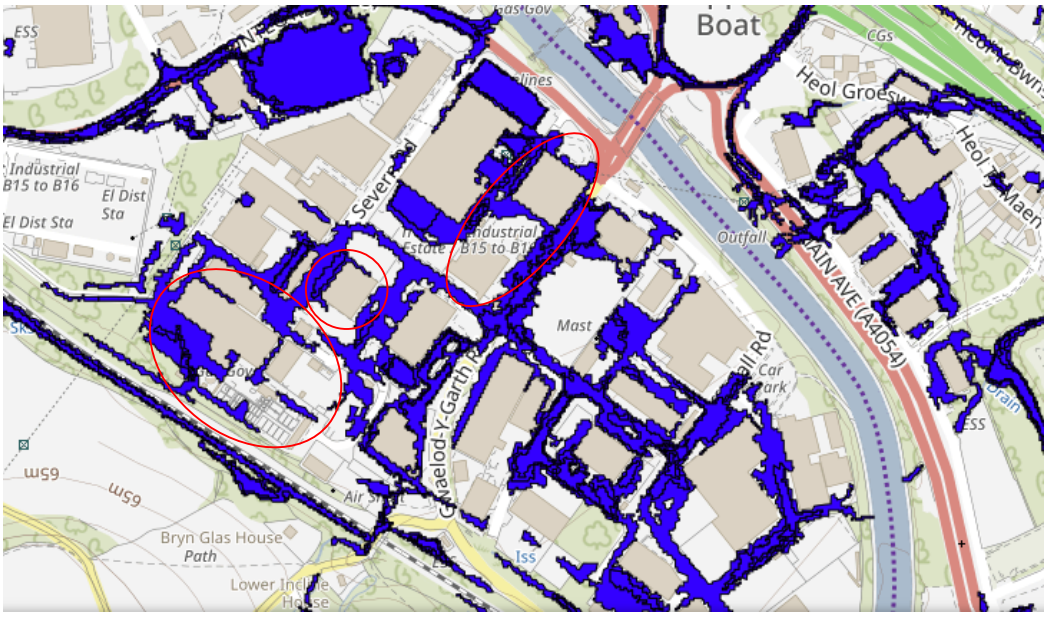


Figure 4: Flood Risk Assessment –
Flood Risk from Surface Water and Small Watercourses



3.1.22. The location of the storage of potentially polluting material has been carefully selected to ensure none are to be stored on areas designated by NRW as being at risk of flooding from surface waters and small watercourses as shown by the Site Layout Plan submitted with the application.

3.1.23. Furthermore, where possible, all bunding is integral to prevent any ingress of water in the event of flooding. The external secondary containment bunding which is not covered is inspected and emptied of any rainwater on a weekly basis or during heavy rainfall events to ensure the bund capacity is not compromised e.g. the hydrogen chloride IBC bunding.

3.1.24. Consequently, on review of the flood risk at the Installation and the measures in place, the bunding is sufficient and appropriate to the level of risk.

4. DESIGN, PERFORMANCE AND MAINTENANCE OF SELECTED BUNDING

4.1. Design and Performance

4.1.1. Integrally self-bunded tanks will be carefully selected ensuring the tanks have been designed and manufactured to the appropriate specification and standards for the substance that will be stored within it. Interfaces with gauge levels and sensors will be included.

4.1.2. The external concrete bunds have been designed to BS EN 1992:2006 and consideration for the following;

- bund shape due to site constraints;
- impermeability;
- absence of drains within bunds;
- nearest proximity to primary storage whilst also accounting for jetting;
- leak detection on storage vessels;
- absence of pipework piercing walls;
- strength;
- shrinkage consideration;
- thermal expansion consideration;
- curing and crack control;
- durability;
- structural independence; and
- accessibility.

4.2. Maintenance Schedule

4.2.1. The monitoring and maintenance of bunds is considered an important factor. A weekly maintenance schedule has been adopted within the management system. The schedule will comprise:

- site walkaround/inspection of containment vessels and bunding;
- inspect external bunds for rainwater and action removal immediately – this shall also be undertaken following any rainfall event;
- note signs of any deterioration of tanks or surroundings;
- note any small leaks or spills, fix any leaks and clean up spills;
- inventory checks will be undertaken (level check).

4.2.2. PB Gelatins also propose to commission external specialist engineers to attend site annually to undertake storage tank and bund integrity testing. Any findings will be actioned immediately.

5. CONCLUSION

5.1. Summary

5.1.1. Following completion of the risk assessment as detailed in the CIRIA C736, PB Gelatins has designed local secondary containment systems zone by zone for the storage of potentially polluting materials.

5.1.2. PB Gelatins will ensure that potentially polluting materials stored externally will benefit from local secondary containment that has a maximum capacity of 110% of the largest container or 25% of the total tank capacity within the bund, whichever is greater.

5.1.3. Integrally self-bunded tanks for caustic and glycol have been selected ensuring the tanks and bunding have been designed and manufactured to the appropriate specification and standards for the substance that will be stored within it. Interfaces with gauge levels and sensors will be included.

5.1.4. The external concrete bunds for the separate external storage areas have been designed to BS EN 1992:2006 and several factors have been considered, such as impermeability, strength, shrinkage, thermal expansion, crack control and durability.

5.1.5. PB Gelatins will implement a maintenance regime which will include several checks and inspections on both the primary container and secondary containment which will be fully documented within the management System.

5.1.6. As a tertiary measure, PB Gelatins will isolate the pumps to ensure potentially polluting material will not be discharged beyond the Installation boundary via the drainage network.

5.1.7. As part of the Emergency Preparedness and Response Plan (“EPRP”), PBGE weather information must be obtained from the MET office only. River levels are to be obtained from the NRW web page, Upper Boat monitoring station, also attention should be given to further up the monitoring stations.

5.1.8. PBGE have signed up to the Flood Alert Warnings with NRW. The EPRP also has locations across the PBGE installation where flood barriers are to be located depending on the river level. Therefore, any risk from flooding has been identified, assessed and mitigated even though the installation is deemed a low-moderate risk overall of flooding from Surface Water and Small Watercourses.