



Flood Risk Assessment and Surface Water Drainage Strategy

Prepared for:

JCC Lighting Products Ltd

May 2019

Our reference:

88684-150219-MTP-Bersted

Location:

Innovation Centre,
Beeding Close,
Bersted
PO22 9TS



Document Issue Record

Location:	Innovation Centre, Beeding Close, Bersted PO22 9TS				
Application:	Erection of an industrial building, ancillary to the existing operations				
Prepared for:	JCC Lighting Products Ltd				
Title:	Flood Risk Assessment and Surface Water Drainage Strategy for Planning				
Project No.:	88684	Date:	29 th May 2019	Issue No.:	1.0
Written By:	T. Smith BSc (Hons)	Checked By:	E. Bouet, BSc (Hons) J. Stone, MSc (Hons)	Authorised By:	T. Smith BSc (Hons)

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1. Introduction

- 1.1. This Flood Risk Assessment and Surface Water Drainage Strategy has been prepared by Unda Consulting Limited on behalf of JCC Lighting Products Ltd, in support of a planning application for the *erection of an industrial building, ancillary to the existing operations*, at Innovation Centre, Beeding Close, Bersted PO22 9TS. This report assesses the flood risk and surface water drainage for the proposed development.
- 1.2. The planning application is for the erection of a temporary industrial building, ancillary to the existing operations. The new industrial building is designed to be operational for three years and has introduced an additional 150m² of roof area to the site.
- 1.3. In order to mitigate flood risk posed by the development's runoff, adequate control measures will be required within the site. This will ensure that surface water runoff is dealt with at source and the flood risk off site is not increased.

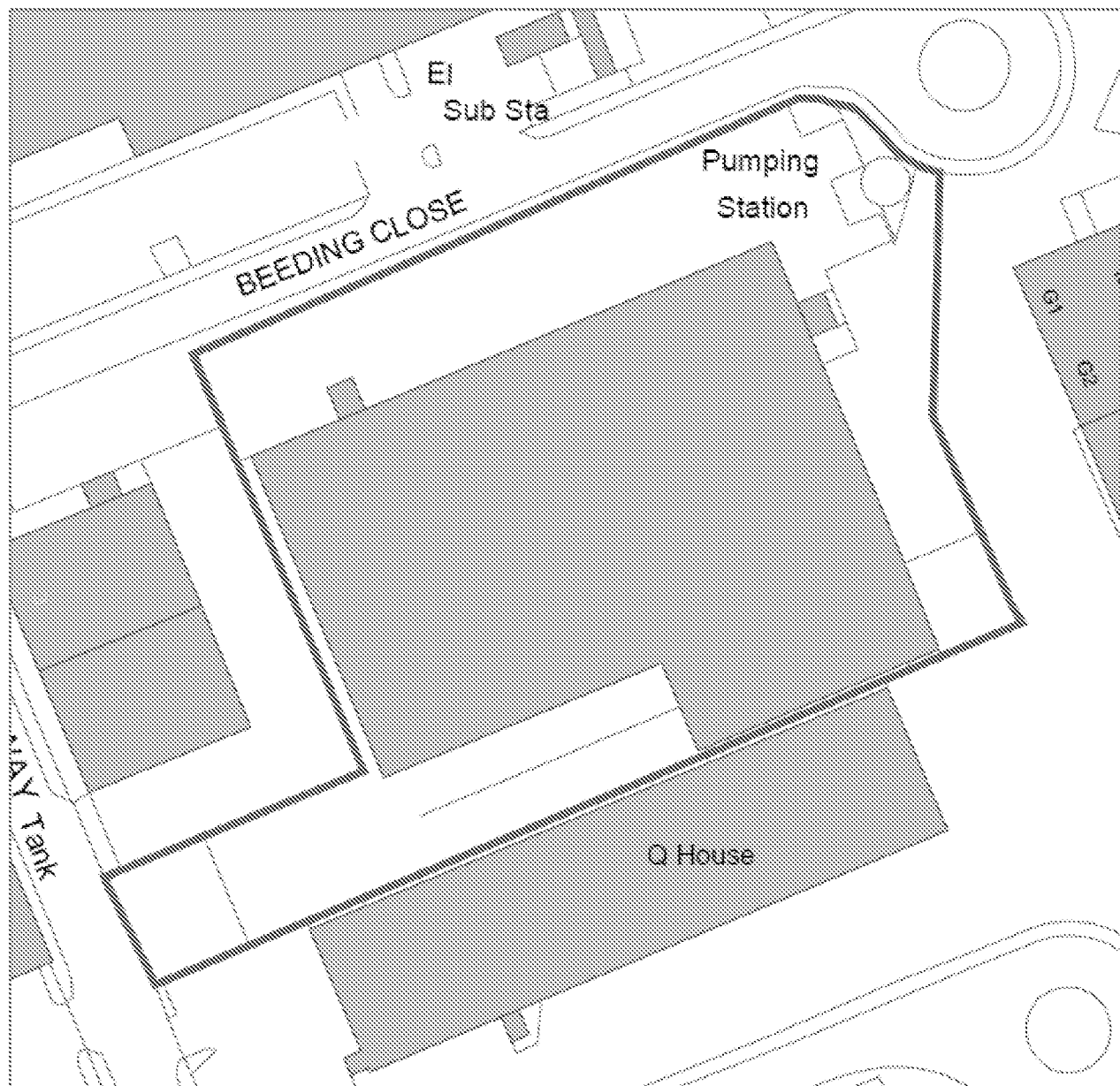


Figure 1: Site location plan (Source: mha Architects)

2. Existing Site:

- 2.1. The existing site is occupied by an industrial building and a car park with 58 spaces. The site is approximately 8356m² and utilised for manufacturing and distribution by JCC Lighting Products Ltd.
- 2.2. JCC Lighting Products Ltd is a lighting development company based in Bognor Regis. The company researches and manufactures lighting products which are distributed throughout the UK in both domestic, commercial and industrial sectors.
- 2.3. The existing site is formed of approximately 100% impermeable surfaces comprising the building, car parking in the north and a pumping station in the north east.
- 2.4. The site is located off Beeding Close, on Southern Cross Trading Estate. As such, the surrounding area is characterised by similar industrial facilities and predominantly impermeable.



Figure 2: Site location (Source: Google)



Figure 3: Southern View from Beeding Close (Source: Unda Consulting Ltd)

Site Topography:

- 2.5. A topographical survey has not been provided by the client however, 0.5m resolution LiDAR data is available for the site. This indicates that levels on site range between approximately 2.40m AOD and 2.80m AOD, with the site sloping gently down from higher land in the south towards the car park in the north.
- 2.6. According to LiDAR data the new unit has been developed upon land with an approximate elevation of 2.75m AOD.

Existing Ground Conditions:

- 2.7. The 1:50,000 BGS map shows the site to be located upon the bedrock of numerous Chalk Formations – Chalk. This strata was formed between the Turonian Age and Campanian Age.
- 2.8. According to BGS mapping superficial deposits comprising River Terrace Deposits – Sand Silt and Clay - underlie the site.
- 2.9. The soil type taken from the BGS UKSO Soil Map Viewer, shows a soil parent material of Deep River Loam with a soil texture of Sand to Sandy Loam.
- 2.10. Nearby BGS borehole logs show that there is no resting groundwater level within 4.0m of the surface.
- 2.11. The published Environment Agency Groundwater Vulnerability map shows the site is not located within an area classified as a Groundwater Source Protection Zone.

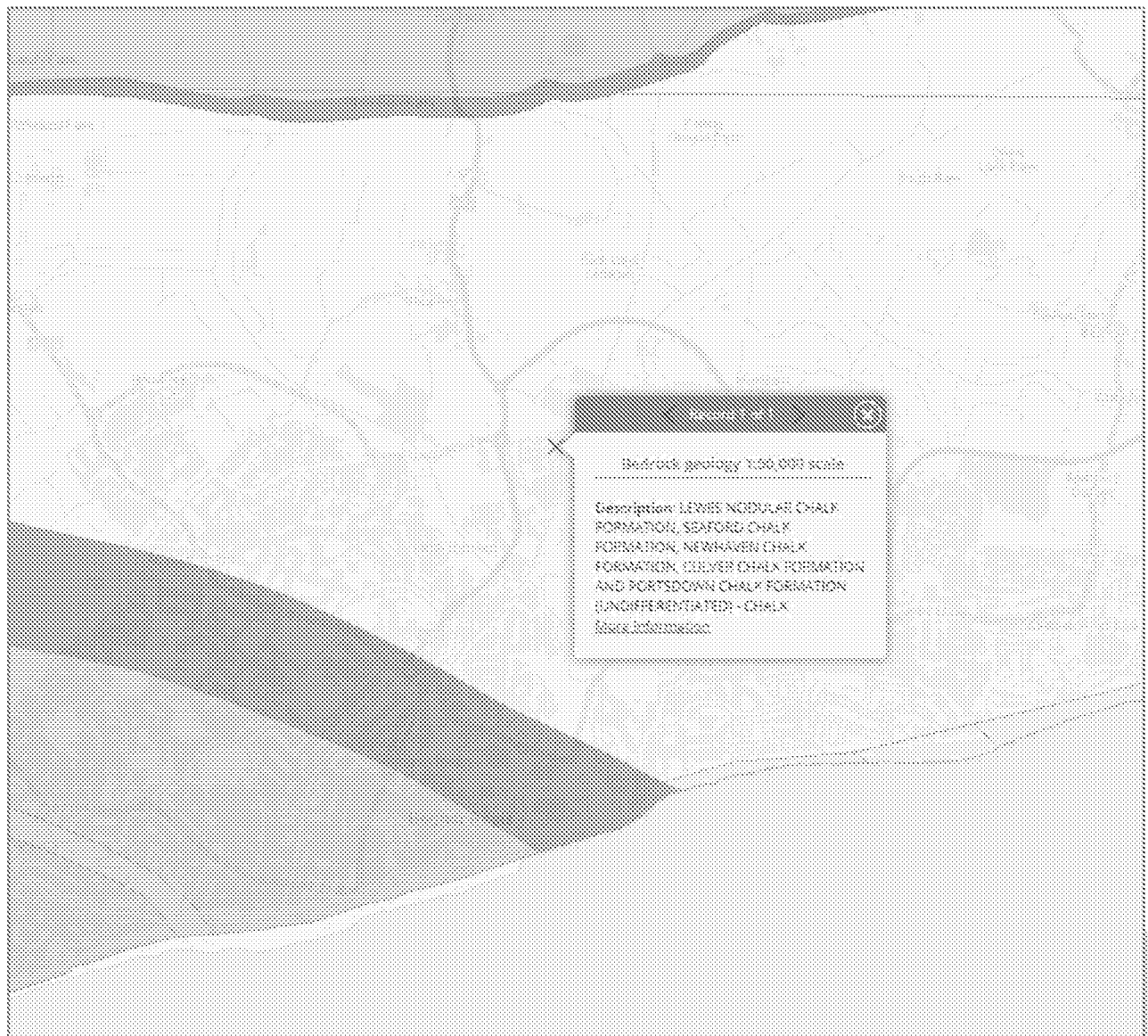


Figure 4: BGS Bedrock Geology (Source: BGS)

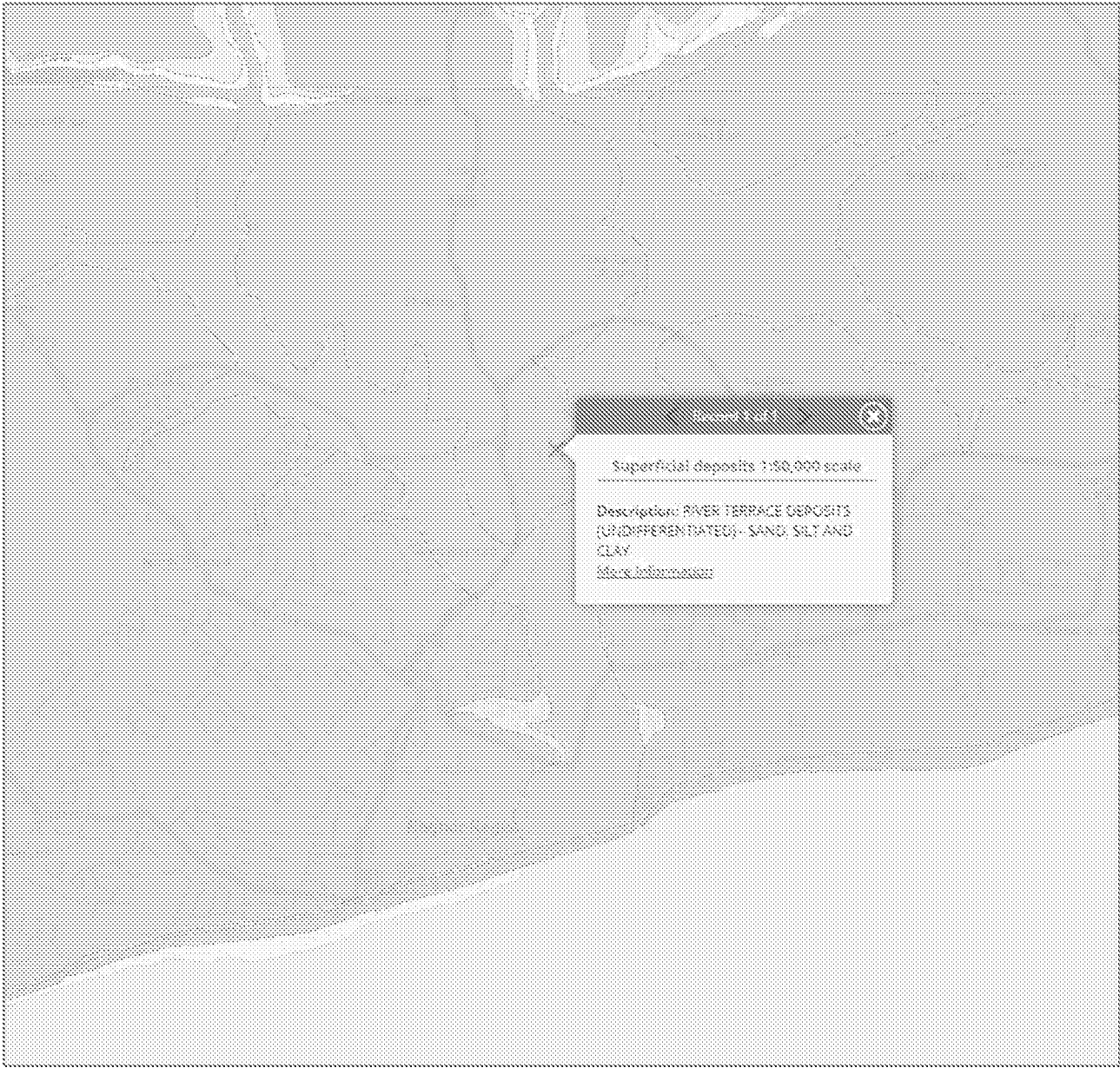


Figure 5: BGS Superficial Geology (Source: BGS)

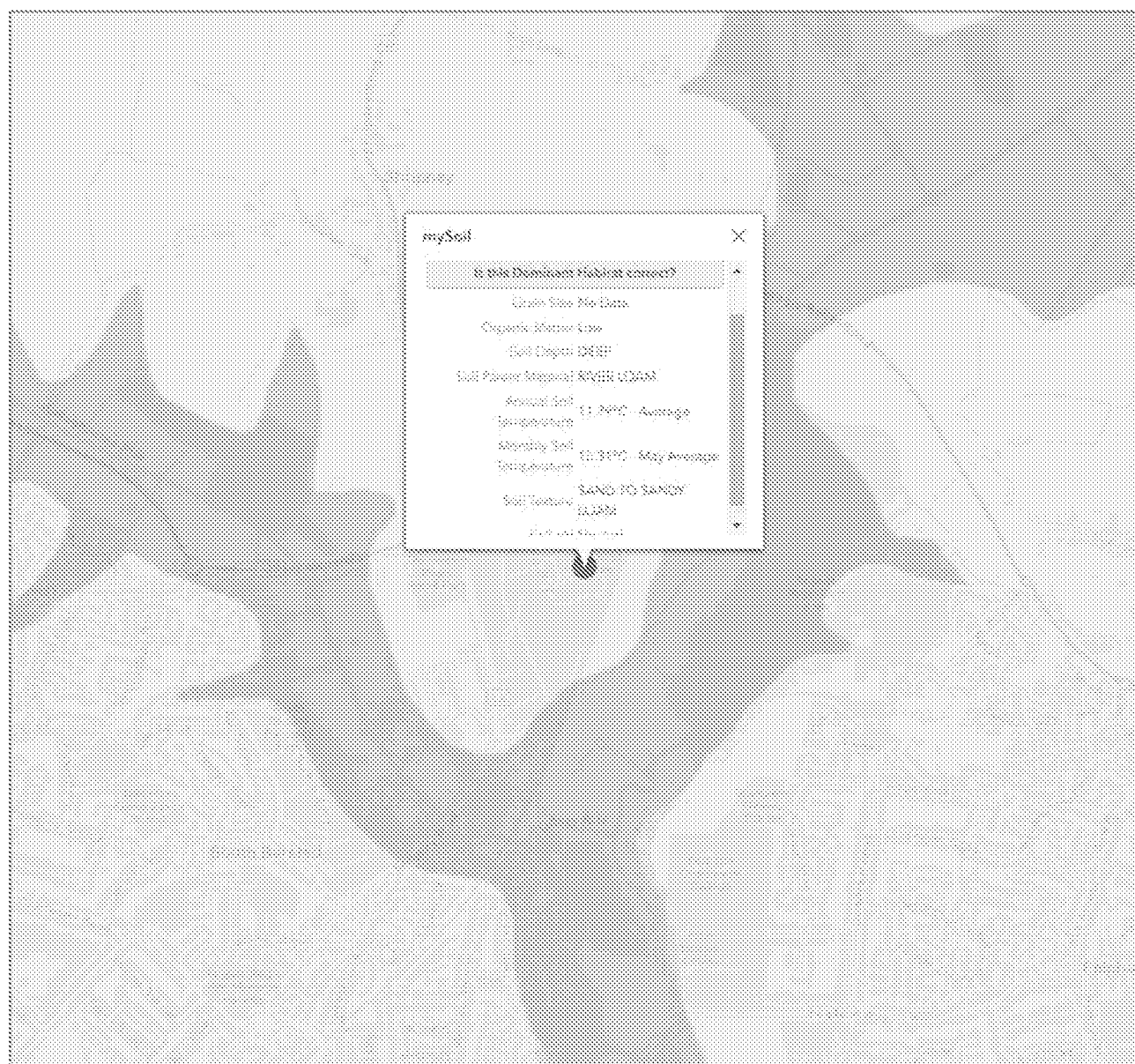


Figure 6: Soil Map (Source: UK Soils, BGS)

Nearby Watercourses / Drainage Features:

- 2.12. There are no existing watercourses or rivers within a close proximity to the site.
- 2.13. The nearest watercourse is an unnamed drainage channel, 170m north east of the site, which flows parallel to the railway sidings in a northerly direction before ultimately discharging into the English Channel.

Existing Drainage:

- 2.14. Asset records obtained from Southern Water indicate the presence of a 225mm vitrified clay foul sewer running beneath the north of the site, in an easterly direction, and a foul rising main under the eastern edge of the site, flowing in a northerly direction. Both foul sewers appear to connect to the pumping station located in the north eastern corner of the site.
- 2.15. Southern Water also hold records of two concrete (pre-cast) surface water sewers in close proximity to the site. One 10m north of the boundary, beneath Beeding Close, and the other 10m east of the site with pipe diameters of 675mm and 750mm, respectively.

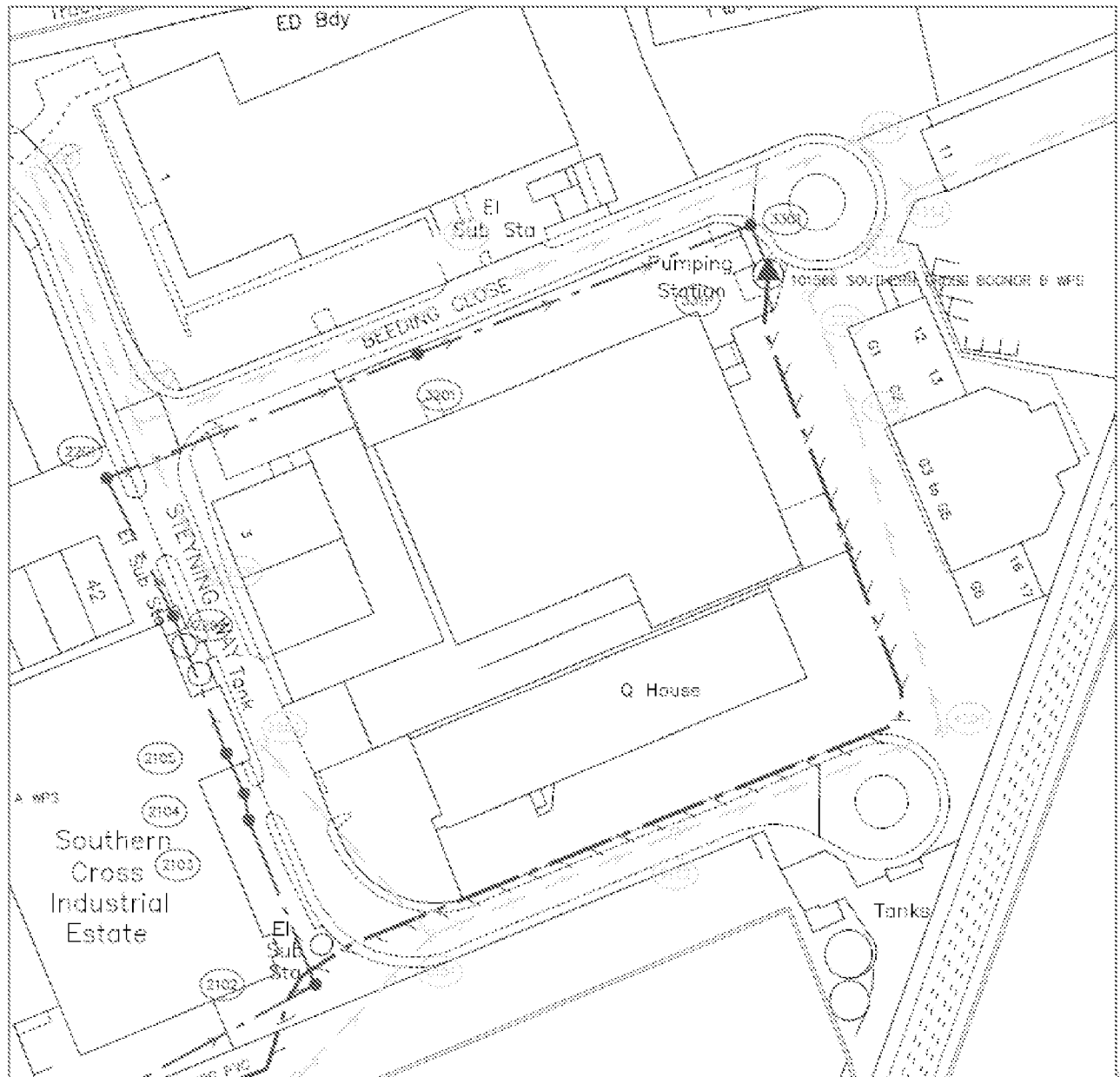


Figure 7: Local sewer network (Source: Southern Water)

Private Drainage Arrangement:

- 2.16. In addition to Southern Water records the client has provided details of the current surface water drainage arrangements at the site. According to the plans provided by the client any surface water runoff at the site is directed towards an extensive series of open gullies and ACO drains, before passing through an oil interceptor under the north east of the site, and connecting to the main surface water sewer offsite (refer to figures 8, 9 and 10).
- 2.17. According to information provided by JCC Lighting Products Ltd, the existing surface water drainage arrangements at the site ultimately connect to a Southern Water surface water sewer approximately 20m north east. Having cross referenced the client's plan with Southern Water mapping it would appear that the current drainage network connects and discharges to manhole reference 4355; cover and invert level of 3.01mAOD and 1.41mAOD, respectively.
- 2.18. Given the drainage arrangements already in place, and the fact that the entire sit is underlain by concrete hardstanding, we would propose utilising the existing service connection.

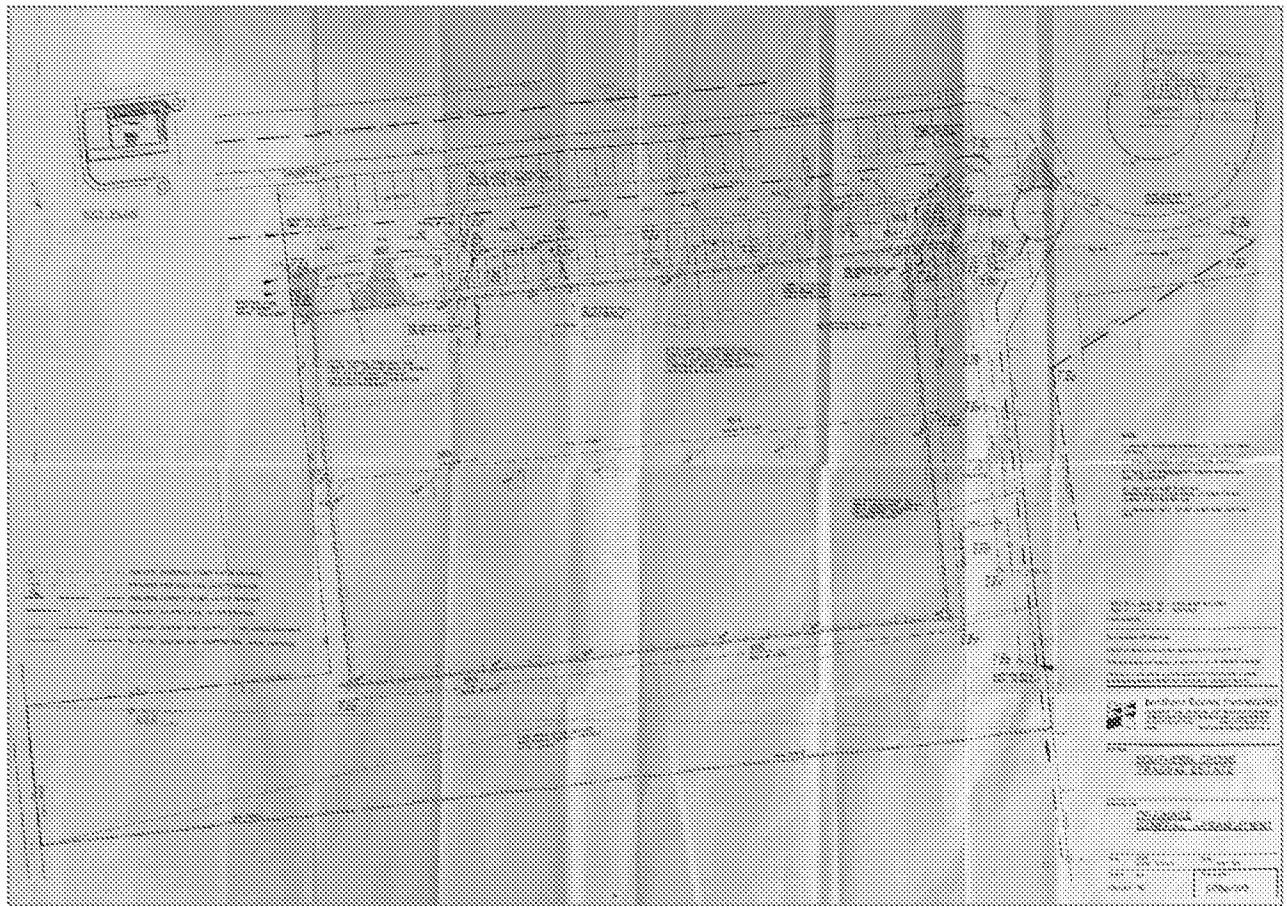


Figure 8: Existing Drainage Arrangement (Source: Bedford Eccles Partnership)



Figure 9: Car Park ACO Drain (Source: Unda Consulting Ltd)



Figure 10: Gully Along Eastern Boundary (Source: Unda Consulting Ltd)

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3. Development Proposals:

Proposed Development:

- 3.1. The proposed planning application is for the erection of a temporary industrial building, ancillary to the existing operations.
- 3.2. The new industrial building is integral for business expansion and has introduced an additional 150m² of roof area to the site.

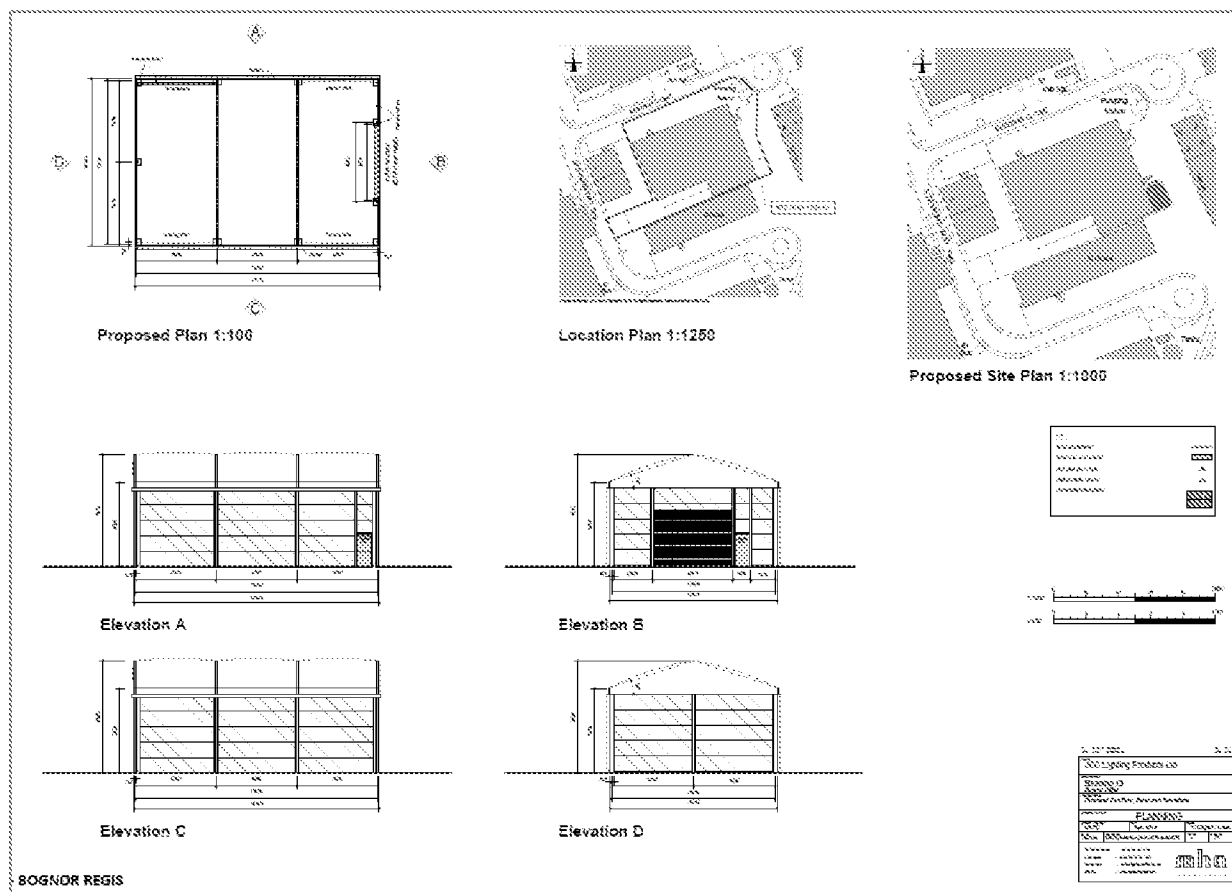


Figure 11: Development Plan (Source: mha Architects)



Figure 12: Temporary Industrial Building (Source: Unda Consulting Ltd)

Vulnerability to flooding:

- 3.3. The NPPF classifies property usage by vulnerability to flooding. Pre-construction, the site formed land associated with the adjacent industrial unit and was therefore classified as “less vulnerable” under the NPPF. The site has remained “less vulnerable”, as the application is for erection of a temporary industrial building, ancillary to the existing operations.
- 3.4. Accordingly, it is considered that the vulnerability of the site as a whole has not increased post development.

4. Flood Risk Assessment:

Flood Zones:

4.1. Within planning, Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences. They are shown on the Environment Agency's Flood Map for Planning (Rivers and Sea), available on the Environment Agency's website.

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

Table 1: Environment Agency Flood Map for Planning (Rivers and Sea) (Source: EA)

4.2. The Flood Zones shown on the Environment Agency's Flood Map for Planning (Rivers and Sea) do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding.



Figure 13: Environment Agency Flood Map for Planning (Rivers and Sea) (Source: EA)

4.3. The site is located entirely within Flood Zone 1 (Low Probability) which means it is defined as land having greater than a 1:1000 annual probability of fluvial flooding.

Fluvial:

- 4.4. Due to the site topography and distance to the nearest watercourse, the risk of fluvial flooding is considered to be very low.

Tidal:

- 4.5. Given the site's topography and distance to the nearest watercourse, the risk of fluvial flooding is considered to be very low.

Pluvial:

- 4.6. Pluvial (surface water) flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead.
- 4.7. In 2013 the EA, working with Lead Local Flood Authorities (LLFAs), produced an updated Flood Map for Surface Water. It is considered to represent a significant improvement on the previous surface water flood maps available, both in terms of method and representation of the risk of flooding. The modelling techniques and data used are considerably improved, and also incorporated locally produced mapping where this is available to represent features best modelled at a local scale.
- 4.8. The Flood Map for Surface Water assesses flooding scenarios as a result of rainfall with the following chance of occurring in any given year (annual probability of flooding is shown in brackets):
- 1:30 (3.3%)
 - 1:100 (1%)
 - 1:1000 (0.1%)
- 4.9. The mapping below shows the Risk of Flooding from Surface Water centred on the site. Please note that the EA do not consider this information suitable to be used to identify the risk to individual properties or sites. It is useful to raise awareness in areas which may be at risk and may require additional investigation.
- 4.10. The EA Risk of Flooding from Surface Water Map suggests that the majority of site, including the new industrial unit, lies within an area at "Very Low" risk of flooding from surface water.
- 4.11. However, it appears that surface water runoff has been modelled to collect in the north of the site with the car park and part of Beeding Close identified at "Low" to "High" risk.

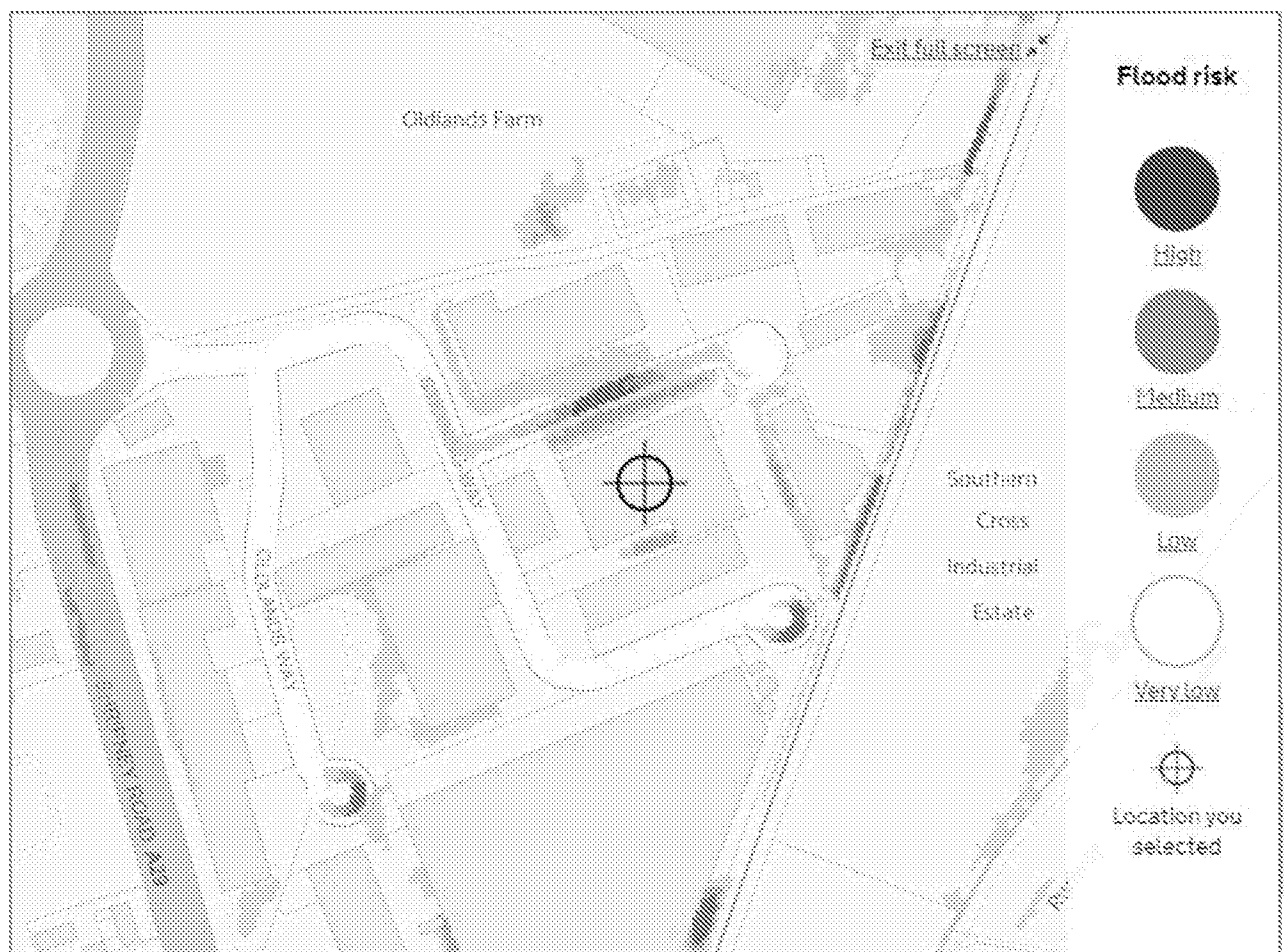


Figure 14: Extract from Environment Agency RoFSW map (Source: EA)

Groundwater:

- 4.12. Groundwater flooding occurs as a result of water rising up from the underlying rocks or from water flowing from abnormal springs. This tends to occur after much longer periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels. Groundwater tends to flow from areas where the ground level is high, to areas where the ground level is low. In low-lying areas the water table is usually at shallower depths anyway, but during very wet periods, with all the additional groundwater flowing towards these areas, the water table can rise up to the surface causing groundwater flooding.
- 4.13. Groundwater flooding is most likely to occur in low-lying areas underlain by permeable rocks (aquifers). These may be extensive, regional aquifers, such as chalk or sandstone, or may be localised sands or river gravels in valley bottoms underlain by less permeable rocks. Groundwater flooding takes longer to dissipate because groundwater moves much more slowly than surface water and will take time to flow away underground.
- 4.14. According to Arun District Council Strategic Flood Risk Assessment (Update 2016) the site is located in an area that is $\geq 25\% < 50\%$ susceptible to groundwater flooding.

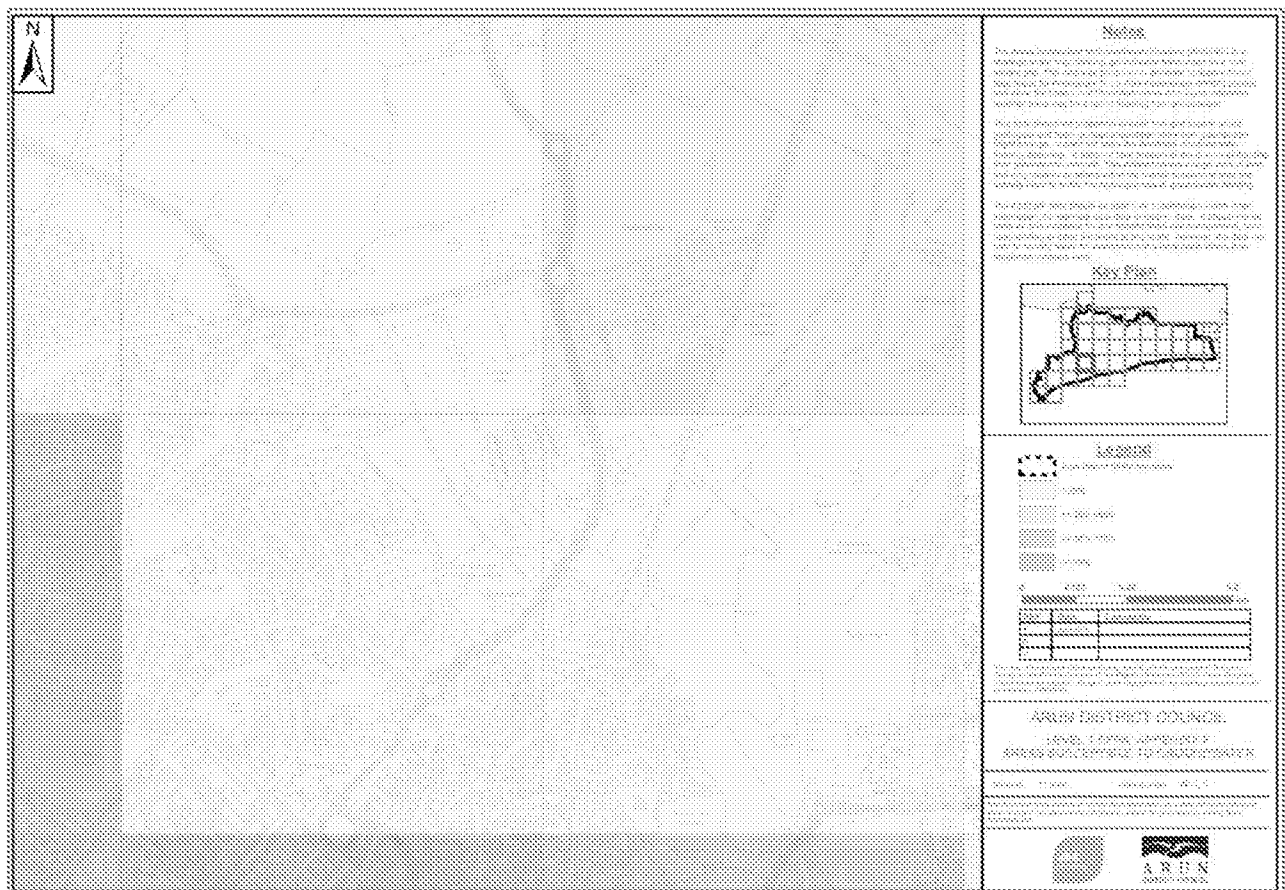


Figure 15: Areas Susceptible to Groundwater Flooding Map (Source: Arun District Council SFRA Update 2016)

Sewer:

- 4.15. Sewer flooding occurs when the sewer network cannot cope with the volume of water that is entering it. It is often experienced during times of heavy rainfall when large amounts of surface water overwhelm the sewer network causing flooding. Temporary problems such as blockages, siltation, collapses and equipment or operational failures can also result in sewer flooding.
- 4.16. All Water Companies have a statutory obligation to maintain a register of properties/areas which have reported records of flooding from the public sewerage system, and this is shown on the DG5 Flood Register. This includes records of flooding from foul sewers, combined sewers and surface water sewers which are deemed to be public and therefore maintained by the Water Company. The DG5 register records of flood incidents resulting in both internal property flooding and external flooding incidents. Once a property is identified on the DG5 register, water companies can typically put funding in place to address the issues and hence enable the property to be removed from the register. It should be noted that flooding from land drainage, highway drainage, rivers/watercourses and private sewers is not recorded within the register.
- 4.17. According to Arun District Council's updated SFRA mapping the Local Authority hold no information of any sewer flood incidents in the vicinity of the site.

Other Sources:

- 4.18. The EA Risk of Flooding from Reservoirs Map suggests that the site lies outside the "Maximum extent of flooding" from reservoir failure. The EA also advise on their website that reservoir flooding is extremely unlikely. All major reservoirs have to be inspected by specialist dam and reservoir Engineers. These inspections are monitored and enforced by the EA themselves. The risk to the site from reservoir flooding is therefore minimal and is far lower than that relating to the potential for fluvial flooding to occur.
- 4.19. No further information has been provided to suggest the site is susceptible to from the failure of reservoirs, canals or other artificial infrastructure from the risk of flooding.

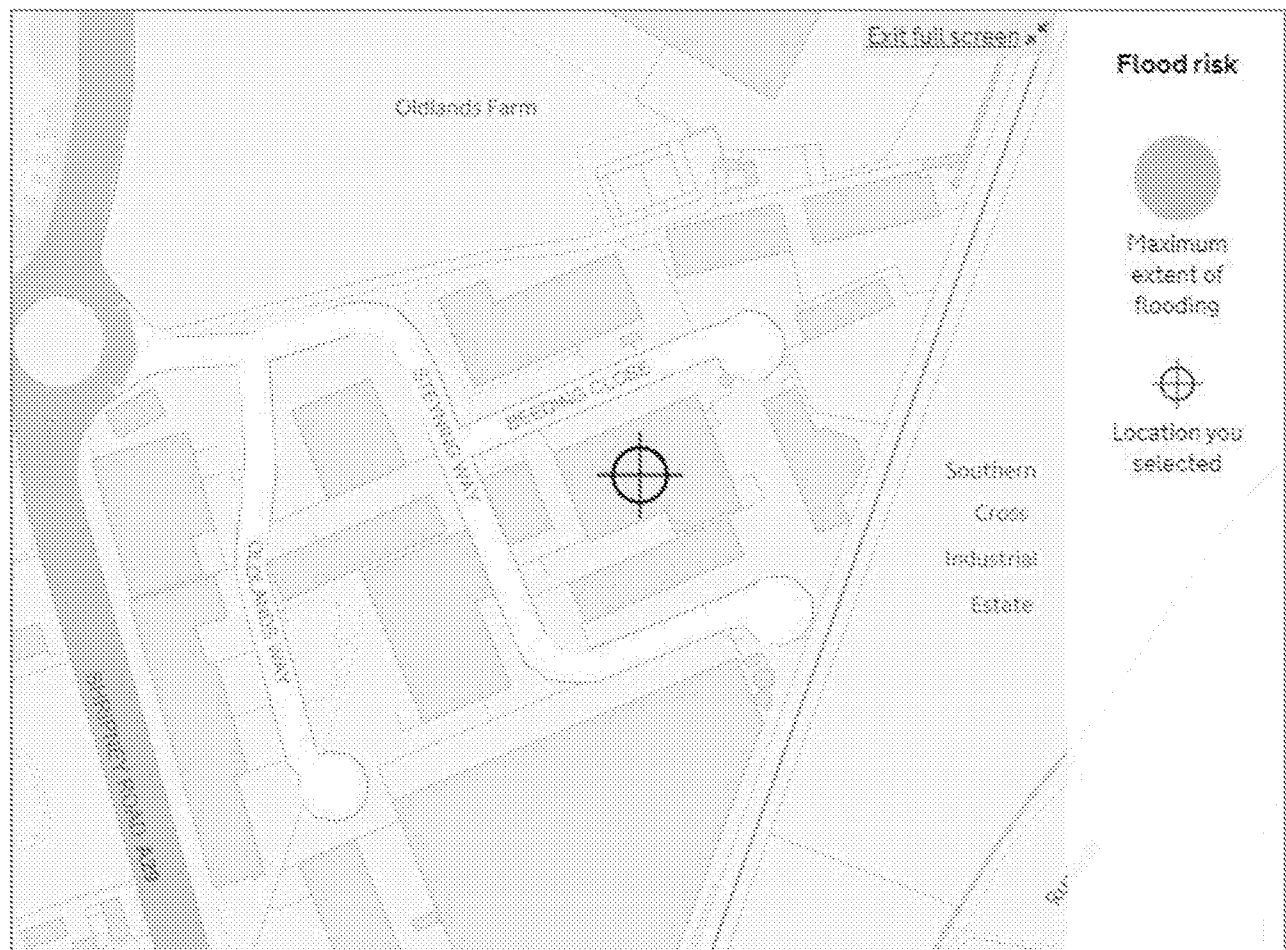


Figure 16: Extract from Environment Agency Flood Risk from Reservoirs map (Source: EA)

5. Surface Water Drainage Strategy:

- 5.1. In order to mitigate flood risk posed by post development runoff, adequate control measures will need to be considered within the site. This will ensure that surface water runoff is dealt with at source and flood risk is not increased elsewhere.

Drainage Hierarchy:

- 5.2. The drainage strategy for the site has been prepared according to the drainage discharge hierarchy from CIRIA C753 The Suds Manual, as follows:
- Infiltration to the maximum extent that is practical;
 - Discharge to surface waters;
 - Discharge to surface water sewer.

Infiltration Potential:

- 5.3. Records from the BGS indicate that the site is located upon River Terrace Deposits and a bedrock Chalk Formation, therefore infiltration may be feasible.
- 5.4. Given the underlying geology, Laura Gibbon (Drainage Engineer) has requested that intrusive investigations are undertaken at the site to determine the possibility of infiltration drainage, and to monitor in situ groundwater levels (refer email dated 22nd January 2019 within the report appendix).
- 5.5. However, following a site reconnaissance there are a number of site constraints that have not been considered during the consultation process.

Site Constraints:

Concrete Hardstanding

- 5.6. The development comprises 150m² which is less than 2% of the total site area. The site is already entirely underlain by concrete hardstanding therefore any intrusive investigations would require the excavation of vast quantities of concrete. Any trial pits would need to be back filled with concrete so that business operations can resume post testing.
- 5.7. This process of excavation and backfill would need to be repeated should crate systems be requested as part of a soakaway or attenuation storage scheme, along with new drainage pipe arrangements.
- 5.8. Such works would require the disposal of tonnes of aggregate waste and entail large amounts of new concrete to be laid at the site. Taking this into consideration, the request for intrusive investigations is considered unsustainable and damaging to the environment.

Insufficient Space

- 5.9. Indicative soakaway sizing has been calculated based on a minimum viable infiltration rate of 1.0×10^{-6} m/s. This indicates that a soakaway with dimensions 150m² x 0.5m deep would be required to attenuate runoff from the newly introduced roof area (150m²) arising during the critical 1:100 year + 40% climate change event.
- 5.10. Having reviewed the existing site plans and applied the relevant buffer distances from all buildings, sewers and boundaries there is insufficient space to locate any soakaway at the site. A parcel of land measuring 43m² was initially identified, located directly in front of the operational loading bay. However, upon further review of the existing drainage network, pipework runs beneath this area thus leaving it unsuitable for siting of a soakaway.

Business Disruption

- 5.11. JCC Lighting Products Ltd have confirmed that the business unit on site despatches an average of £150k of product per day. As such, for every day the area is closed for testing and installation JCC would lose £150k worth of sales.
- 5.12. Additionally, whilst testing and installation is being undertaken stock would not be able to be received from Southampton Docks. In this instance, JCC Lighting Products Ltd would be liable to off-quay charges of two containers per day at £300 per day.
- 5.13. Given the above, any works that involve excavations at the site would cause significant business interruption and make the scheme commercially unviable.

Additional Consideration:

- 5.14. The new industrial building is a temporary structure and planned to be in operation for only three years. Given the constraints associated with the site any intrusive works are considered disproportionate to the scale and nature of the development.

Discharge Location:

- 5.15. Given the aforementioned site constraints infiltration drainage is considered unviable.
- 5.16. There are no existing watercourses or rivers within close proximity to the site.
- 5.17. Therefore, it is proposed to utilise the existing connection and discharge post development runoff to the existing surface water sewer located 20m north east of the site boundary.

Proposed Discharge:

- 5.18. Existing greenfield runoff rates for the total site (8356m²) have been calculated as 2.5 l/s for the 1:1 annual runoff event, 6.5 l/s for the 1:30 year event and 9.2 l/s for the 1:100 year event. Refer to calculations in appendix.
- 5.19. However, the existing site is brownfield and covered by approximately 100% impermeable surfacing, comprising the existing built footprint and hardstanding. Runoff rates for the existing site (including the 75% impermeable coverage) have been calculated using MicroDrainage as 6.9 l/s for the 1:1 annual runoff event, 14.1 l/s for the 1:30 year event and 16.4 l/s for the 1:100 year event. Refer to calculations in appendix.
- 5.20. The development area (150m²) forms less than 2% of the total site area therefore any increase in runoff is considered minimal in comparison to the site as a whole.
- 5.21. Despite this, existing runoff rates have been calculated for the development area (150m²). Greenfield runoff rates have been calculated as 0.0l/s for the 1:1 annual runoff event, 0.1 l/s for the 1:30 year event and 0.2 l/s for the 1:100 year event.
- 5.22. Roof runoff from the new industrial building will be discharged to the existing surface water network at the site. From the on-site drainage arrangement surface water will be discharged into the Southern Water sewer via manhole reference 4355 (refer to Southern Water Asset Search in the report appendix).

Water Quality:

- 5.23. Runoff from roof areas is considered to be uncontaminated thus does not warrant any form of treatment process to improve water quality.
- 5.24. Nevertheless, it is suggested to include debris / sediment traps on any new drainage.

Design Exceedance:

- 5.25. Should the onsite drainage system fail under extreme rainfall events or blockage, flooding may occur within the site. In the event of the drainage system failure, the runoff flow can be managed through detailing the new external levels to direct water away from structures.

Adoption and Maintenance:

5.26. It is proposed that all SuDS facilities will be maintained privately by the end user.

5.27. A draft Maintenance Schedule is outlined in the Table below.

Pipework and Catchpits:

5.28. It is not envisaged that silt build up within the pipework systems will require a rigorous maintenance regime so long as silt is removed from upstream catch pits on a regular basis. Notwithstanding this, a suitable maintenance regime for the systems will comprise of routine inspection (every three months) and silt removal (as necessary).

Drainage Element	Maintenance Requirement	Frequency
Gutters & downpipes	Inspect and remove silt/ debris	To be inspected every three months and silt/ debris removed as necessary.
Catchpits and inspection chambers	Inspect and remove silt	To be inspected every three months and silt/ debris removed as necessary. Flow control to be checked for blockages.

Table 2: Suggested Maintenance Regime for Elements of the Drainage Infrastructure

Note: In addition to the above maintenance requirements, it is recommended that all drainage elements are inspected:

- Following the first storm event
- Monthly for the first 3 months following commissioning

6. Flood Risk Mitigation:

Physical Design Measures:

- 6.1. The proposed development area lies entirely within Flood Zone 1 according to the EA Flood Map for planning (Rivers and the Sea), thus completely outside Flood Zone 2 and Flood Zone 3 extents.
- 6.2. Despite this, in order to mitigate against any extreme event the client has developed the new industrial building with standard building thresholds in place; raised above adjacent ground levels with ramp access.



Figure 17: Threshold Entry into the New Industrial Unit (Source: Unda Consulting Ltd)

- 6.3. In order to further protect against flooding during extreme events, the applicant may consider implementing flood resistant design measures into the new property, in consultation with the Local Authority building control department. These measures can include the following:
 - Solid concrete ground floor slab, with waterproof membrane;
 - Waterproof screed used on floors;
 - Closed-cell foam used in wall cavities;
 - Waterproof ground floor internal render;
 - External walls rendered resistant to flooding to first floor level;
 - Exterior ventilation outlets, utility points and air bricks fitted with removable waterproof covers;
 - Ground floor electrical main ring run from first floor level; and on separately switched circuit from first floor;
 - Electrical incomer and meter situated at first floor level or above;
 - Boilers, control and water storage / immersion installed at first floor level or above;
 - Gas meter installed at first floor level or above;
 - Plumbing insulation of closed-cell design;
 - Non-return valves fitted to all drain and sewer outlets;

- Manhole covers secured;
- Anti-syphon fitted to all toilets;
- Kitchen units of solid, water resistant material;
- Use of MDF carpentry (i.e. skirting, architrave, built-in storage) avoided at ground floor level;
- Stairs of solid hardwood construction with wood faces treated to resist water penetration.

6.4. The applicant should also consider the use of demountable flood defence barriers to defend ground level doorways and low windows.

Safe Escape:

6.5. The NPPF requires a route of safe escape for all residents and users to be provided from residential properties in Flood Zone 3. Safe escape is usually defined as being through slow moving flood water no deeper than 25cm.

6.6. The planning application relates to a new industrial unit, and the entire site is located within Flood Zone 1, therefore a route of safe escape is not required.

6.7. In the absence of safe escape, users should follow the warning and evacuation procedure detailed in the following section.

Flood Warning:

6.8. The EA is responsible for issuing flood warnings. Flood warnings are issued to the emergency services and local authorities. Both private individuals and organisations can sign-up to receive warnings via phone, text or email. This system of receiving warnings is currently voluntary.

6.9. Advice regarding severe flood warnings will generally be given during weather forecasts on local radio and TV. In the case of extreme events, warnings can also be disseminated via door to door visits by the police or locally appointed flood wardens.

6.10. The EA issue flood warnings to specific areas when flooding is expected. It is recommended that the applicant registers online with the free Environment Agency Floodline Warnings/Alert Direct service at <https://fwd.environment-agency.gov.uk/app/olr/register> to receive flood warnings by phone, text or email.

6.11. The flood warning service has three types of warnings that will help you prepare for flooding and take action:

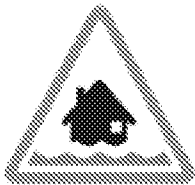
Flood Warning	Flood Alert	Flood Warning	Severe Flood Warning
			
What it means?	Flooding is possible. Be prepared.	Flooding is expected. Immediate action required.	Severe flooding. Danger to life.
When it's used?	Two hours to two days in advance of flooding.	Half an hour to one day in advance of flooding.	When flooding poses a significant threat to life.
What to do?	Be prepared to act on your flood plan. Prepare a flood kit of essential items. Monitor local water levels and the flood forecast on our website.	Move family, pets and valuables to a safe place. Turn off gas, electricity and water supplies if safe to do so. Put flood protection equipment in place.	Stay in a safe place with a means of escape. Be ready should you need to evacuate from your home. Co-operate with the emergency services. Call 999 if you are in immediate danger.

Table 3: Flood Warnings

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Flood Plan:

- 6.12. It is recommended that the applicant and future owners, occupiers and Landlords of the property prepare a flood plan to protect life and property during a flood event:

Before a flood:

- Find out if you are at risk of flooding.
- Find out if you can receive flood warnings.
- Prepare and keep a list of all your important contacts to hand or save them on your mobile phone.
- Think about what items you can move now and what you would want to move to safety during a flood such as vehicles, machinery, furniture, and electrical equipment.
- Know how to turn off gas, electricity and water supplies.
- Prepare a flood kit of essential items and keep it handy. It can include copies of important documents, a torch, a battery-powered or wind-up radio, blankets and warm clothing, waterproofs, rubber gloves and a first aid kit including all essential medication.
- Consider buying flood protection products such as flood boards and airbrick covers to help reduce flood water getting into your property.

During a flood:

- Tune into your local radio station on a battery or wind-up radio.
- Grab your flood kit - if you have prepared one.
- Collect blankets, torch, first aid kit, medication and food.
- Move important documents, valuables, and lightweight belongings upstairs or to high shelves.
- Raise large items of furniture, or put them in large bags if you have them.
- Move people, outdoor belongings, cars and machinery to higher ground.
- Switch off water, gas and electricity at mains when water is about to enter your home. Do not touch sources of electricity when standing in water.
- Fit flood protection products, if you have them, for example flood boards, airbrick covers, sandbags.
- Put plugs in sinks. Weigh them down with a plastic bag filled with soil.
- If you do not have non-return valves fitted, plug water inlet pipes with towels or cloths.
- Listen to the advice of the emergency service and evacuate if told to do so.
- Avoid walking or driving through flood water. Six inches of fast-flowing water can knock over an adult and two feet of water can move a car.

After a flood:

- If you have flooded, contact your insurance company as soon as possible.
- Take photographs and videos of your damaged property as a record for your insurance company.
- If you don't have insurance, contact your local authority for information on grants and charities that may help you.
- Flood water can contain sewage, chemicals and animal waste. Always wear waterproof outerwear, including gloves, wellington boots and a face mask.
- Have your electrics, central heating and water checked by qualified engineers before switching them back on.

Fluvial floodplain storage:

- 6.13. The NPPF requires that where development is proposed in undefended areas of floodplain, which lie outside of the functional floodplain, the implications of ground raising operations for flood risk elsewhere needs to be considered. Raising existing ground levels may reduce the capacity of the floodplain to accommodate floodwater and increase the risk of flooding by either increasing the depth of flooding to existing properties at risk or by extending the floodplain to cover properties normally outside of the floodplain. Flood storage capacity can be maintained by lowering ground levels either within the curtilage of the development or elsewhere in the floodplain, in order to maintain at least the same volume of flood storage capacity within the floodplain.
- 6.14. In undefended tidal areas, raising ground levels is unlikely to impact on maximum tidal levels so the provision of compensatory storage should not be necessary.
- 6.15. For development in a defended flood risk area, the impact on residual flood risk to other properties needs to be considered. New development behind flood defences can increase the residual risk of flooding if the flood defences are breached or overtopped by changing the conveyance of the flow paths or by displacing flood water elsewhere. If the potential impact on residual risk is unacceptable then mitigation should be provided.
- 6.16. The site is situated in Flood Zone 1 when using the Environment Agency Flood Map for Planning (Rivers and Sea). No fluvial floodwater has been displaced by the development.

7. Discussion and Conclusions:

- 7.1. This Flood Risk Assessment and Surface Water Drainage Strategy has been prepared by Unda Consulting Limited on behalf of JCC Lighting Products Ltd, in support of a planning application for the *erection of an industrial building, ancillary to the existing operations*, at Innovation Centre, Beeding Close, Bersted PO22 9TS. This report assesses the flood risk and surface water drainage for the proposed development.
- 7.2. The existing site is occupied by an industrial building and a car park with 58 spaces. The site is approximately 8356m² and utilised for manufacturing and distribution by JCC Lighting Products Ltd. JCC Lighting Products Ltd is a lighting development company based in Bognor Regis. The company researches and manufactures lighting products which are distributed throughout the UK in both domestic, commercial and industrial sectors. The existing site is formed of approximately 100% impermeable surfaces comprising the building, car parking in the north and a pumping station in the north east.
- 7.3. A topographical survey has not been provided by the client however, 0.5m resolution LiDAR data is available for the site. This indicates that levels on site range between approximately 2.40mAOD and 2.80mAOD, with the site sloping gently down from higher land in the south towards the car park in the north. According to LiDAR data the new unit has been developed upon land with an approximate elevation of 2.75mAOD.
- 7.4. The proposed planning application is for the erection of a temporary industrial building, ancillary to the existing operations. The new industrial building is integral for business expansion and has introduced an additional 150m² of roof area to the site.
- 7.5. The 1:50,000 BGS map shows the site to be located upon the bedrock of numerous Chalk Formations – Chalk. This strata was formed between the Turonian Age and Campanian Age.
- 7.6. According to BGS mapping superficial deposits comprising River Terrace Deposits – Sand Silt and Clay - underlie the site.
- 7.7. The soil type taken from the BGS UKSO Soil Map Viewer, shows a soil parent material of Deep River Loam with a soil texture of Sand to Sandy Loam.
- 7.8. Nearby BGS borehole logs show that there is no resting groundwater level within 4.0m of the surface.
- 7.9. The published Environment Agency Groundwater Vulnerability map shows the site is not located within an area classified as a Groundwater Source Protection Zone.

Flood Risk Discussion

- 7.10. Due to the site topography and distance to the nearest watercourse, the site is located entirely within Flood Zone 1 (Low Probability). Therefore the risk of fluvial and tidal flooding is considered to be very low.
- 7.11. The EA Risk of Flooding from Surface Water Map suggests that the majority of site, including the new industrial unit, lies within an area at "Very Low" risk of flooding from surface water. However, it appears that surface water runoff has been modelled to collect in the north of the site with the car park and part of Beeding Close identified at "Low" to "High" risk.
- 7.12. In order to mitigate against any extreme event the client has developed the new industrial building with standard building thresholds in place; raised above adjacent ground levels with ramp access (refer to Figure 17).
- 7.13. According to Arun District Council Strategic Flood Risk Assessment (Update 2016) the site is located in an area that is $\geq 25\% < 50\%$ susceptible to groundwater flooding.
- 7.14. The EA Risk of Flooding from Reservoirs Map suggests that the site lies outside the "Maximum extent of flooding" from reservoir failure.
- 7.15. The site is situated in Flood Zone 1 when using the Environment Agency Flood Map for Planning (Rivers and Sea). No fluvial floodwater has been displaced by the development.

Surface Water Drainage Discussion

- 7.16. Records from the BGS indicate that the site is located upon River Terrace Deposits and a bedrock Chalk Formation, therefore infiltration may be feasible.

- 7.17. Given the underlying geology, Laura Gibbon (Drainage Engineer) has requested that intrusive investigations are undertaken at the site to determine the possibility of infiltration drainage, and to monitor in situ groundwater levels (refer email dated 22nd January 2019 within the report appendix).
- 7.18. However, following a site reconnaissance there are a number of site constraints that have not been considered during the consultation process including; the site is entirely underlain by concrete hardstanding, there is insufficient space to locate a soakaway and the business interruption caused by any intrusive works (refer to page 18).
- 7.19. The new industrial building is a temporary structure and planned to be in operation for only three years. Given the constraints associated with the site any intrusive works are considered disproportionate to the scale and nature of the development.
- 7.20. As such, it is proposed to utilise the existing connection and discharge post development runoff to the existing surface water sewer located 20m north east of the site boundary.
- 7.21. Currently any surface water runoff at the site is directed towards an extensive series of open gullies and ACO drains, before passing through an oil interceptor under the north east of the site, and connecting to the main surface water sewer offsite (manhole reference 4355).
- 7.22. Existing greenfield runoff rates for the total site (8356m²) have been calculated as 2.5 l/s for the 1:1 annual runoff event, 6.5 l/s for the 1:30 year event and 9.2 l/s for the 1:100 year event. Refer to calculations in appendix.
- 7.23. However, the existing site is brownfield and covered by approximately 100% impermeable surfacing, comprising the existing built footprint and hardstanding. Runoff rates for the existing site (including the 75% impermeable coverage) have been calculated using MicroDrainage as 6.9 l/s for the 1:1 annual runoff event, 14.1 l/s for the 1:30 year event and 16.4 l/s for the 1:100 year event. Refer to calculations in appendix.
- 7.24. The development area (150m²) forms less than 2% of the total site area therefore any increase in runoff is considered minimal in comparison to the site as a whole.
- 7.25. Despite this, existing runoff rates have been calculated for the development area (150m²). Greenfield runoff rates have been calculated as 0.0l/s for the 1:1 annual runoff event, 0.1 l/s for the 1:30 year event and 0.2 l/s for the 1:100 year event.
- 7.26. Roof runoff from the new industrial building will be discharged to the existing surface water network at the site. From the on-site drainage arrangement surface water will be discharged into the Southern Water sewer via manhole reference 4355 (refer to Southern Water Asset Search in the report appendix).
- 7.27. Water quality has been assessed in line with the Simple Index approach from Chapter 26 of CIRIA C753 The SuDS Manual. Runoff from roof areas is considered to be uncontaminated thus does not warrant any form of treatment process to improve water quality. Nevertheless, it is suggested to include debris / sediment traps on any new drainage.
- 7.28. Should the onsite drainage system fail under extreme rainfall events or blockage, flooding may occur within the site. In the event of the drainage system failure, the runoff flow can be managed through detailing the new external levels to direct water away from structures.
- 7.29. This drainage strategy has been undertaken in accordance with the principles set out in NPPF. We can conclude that providing the development adheres to the conditions advised above, the said development proposals can be accommodated without increasing flood risk within the locality in accordance with objectives set by Central Government and the EA.

Unda Consulting Limited
May 2019

8. Appendix

A - Plans by others:

- Location Plan – mha Architects;
- Development Plan – mha Architects.

B – Local Authority Consultee Comments:

- Drainage Engineer Comments dated 22nd January 2019;
- Proposed Drainage Condition dated 11th February 2019.

C – Drainage Plans:

- Southern Water Asset Search;
- Private Drainage Arrangement - Bedford Eccles Partnership.

D - MicroDrainage Calculations:

- ICP SUDS Rural Runoff Calculations (Entire Site);
- ICP SUDS Urban Runoff Calculations (Entire Site);
- ICP SUDS Rural Runoff Calculations (Development Site);
- Indicative Soakaway Sizing Calculations.

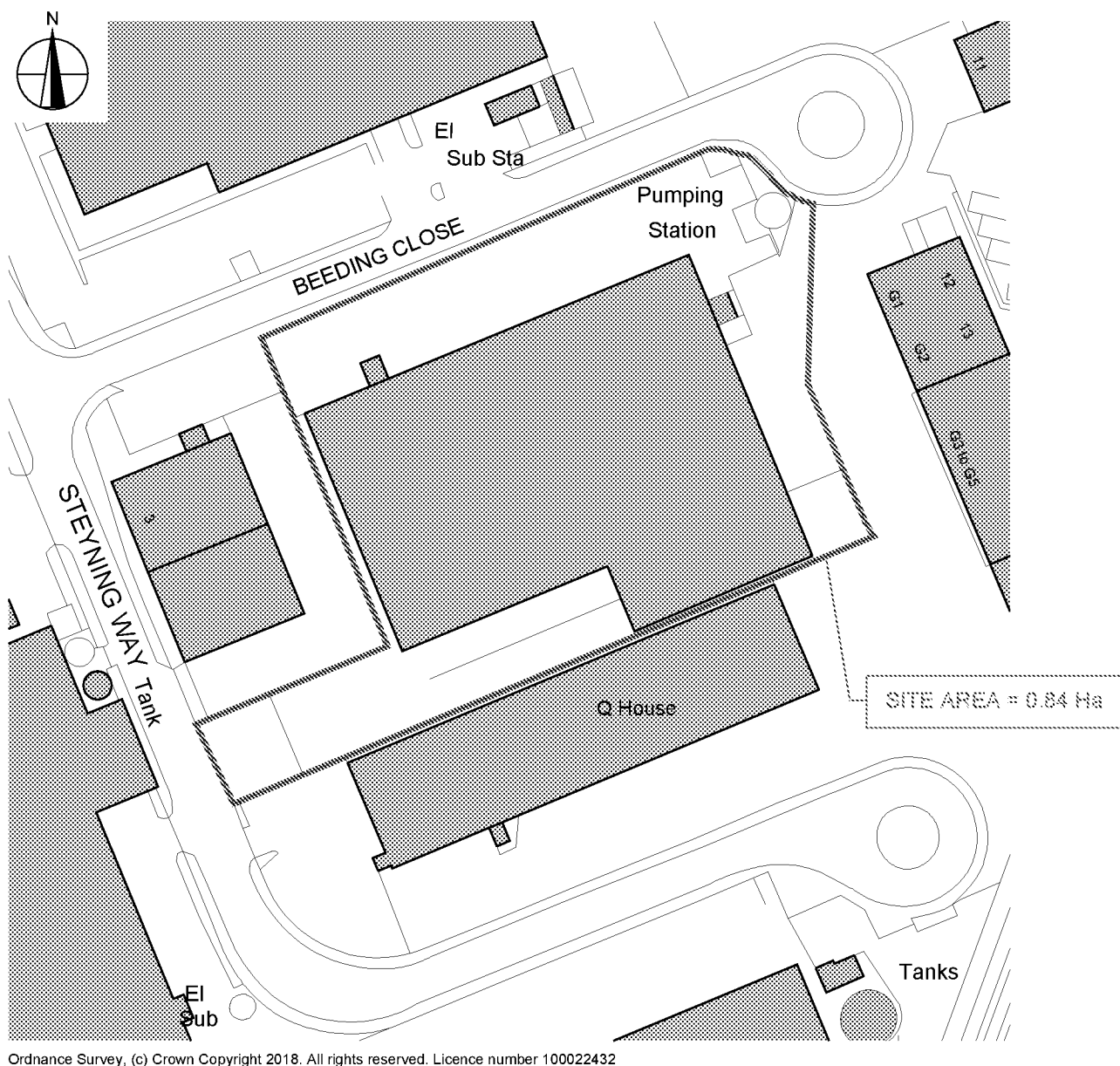
E - Plans:

- Proposed Drainage Layout – 1:100 Scale;
- Proposed Drainage Layout – 1:400 Scale.

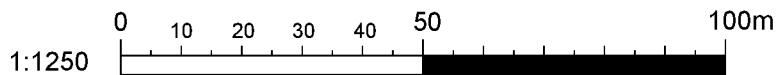
Appendix A

Commercial in Confidence

Unda Consulting Limited, Southpoint, Old Brighton Road, Gatwick, RH11 0PR. 4



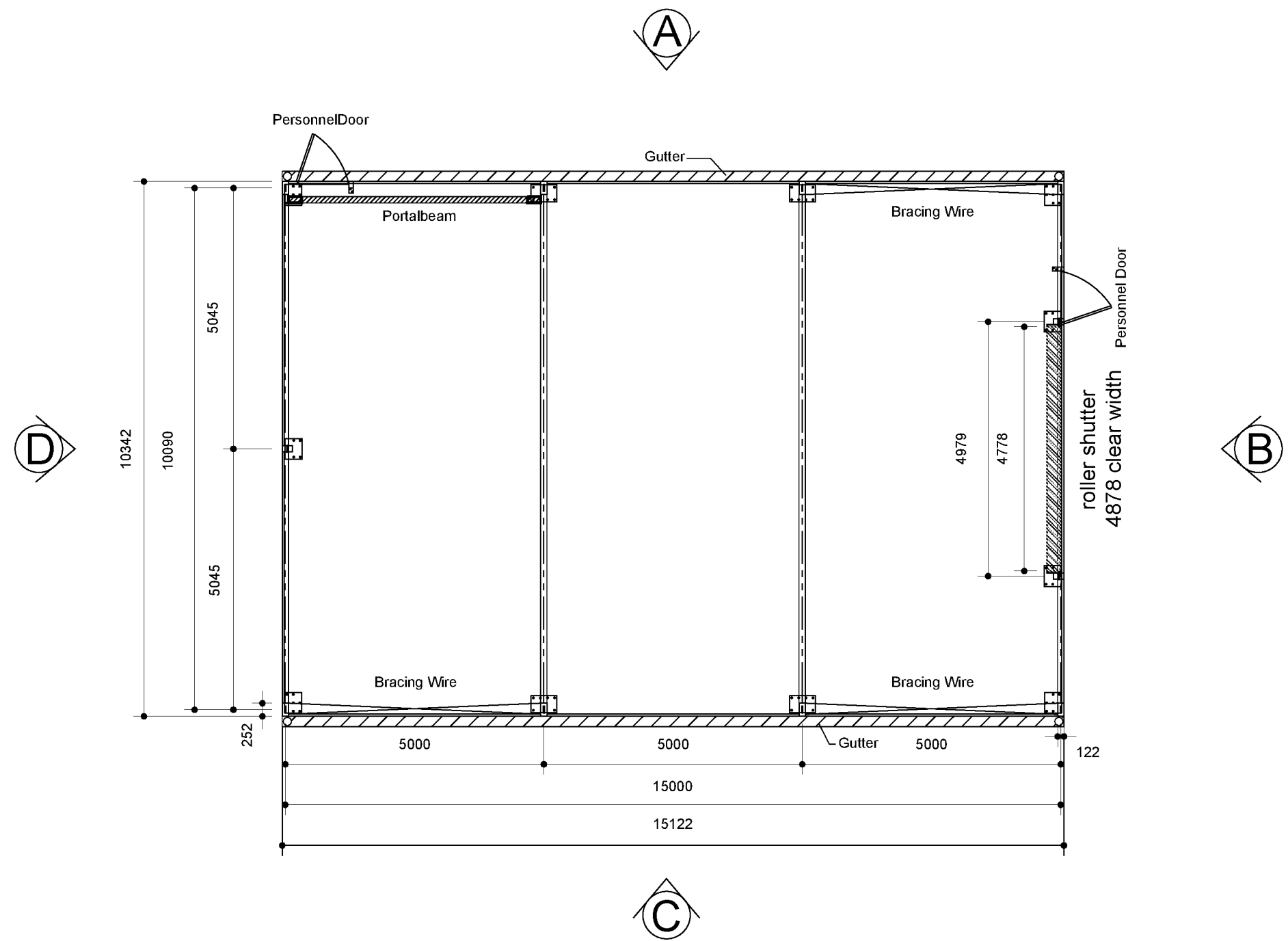
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SITE BOUNDARY	
EXISTING BUILDINGS	



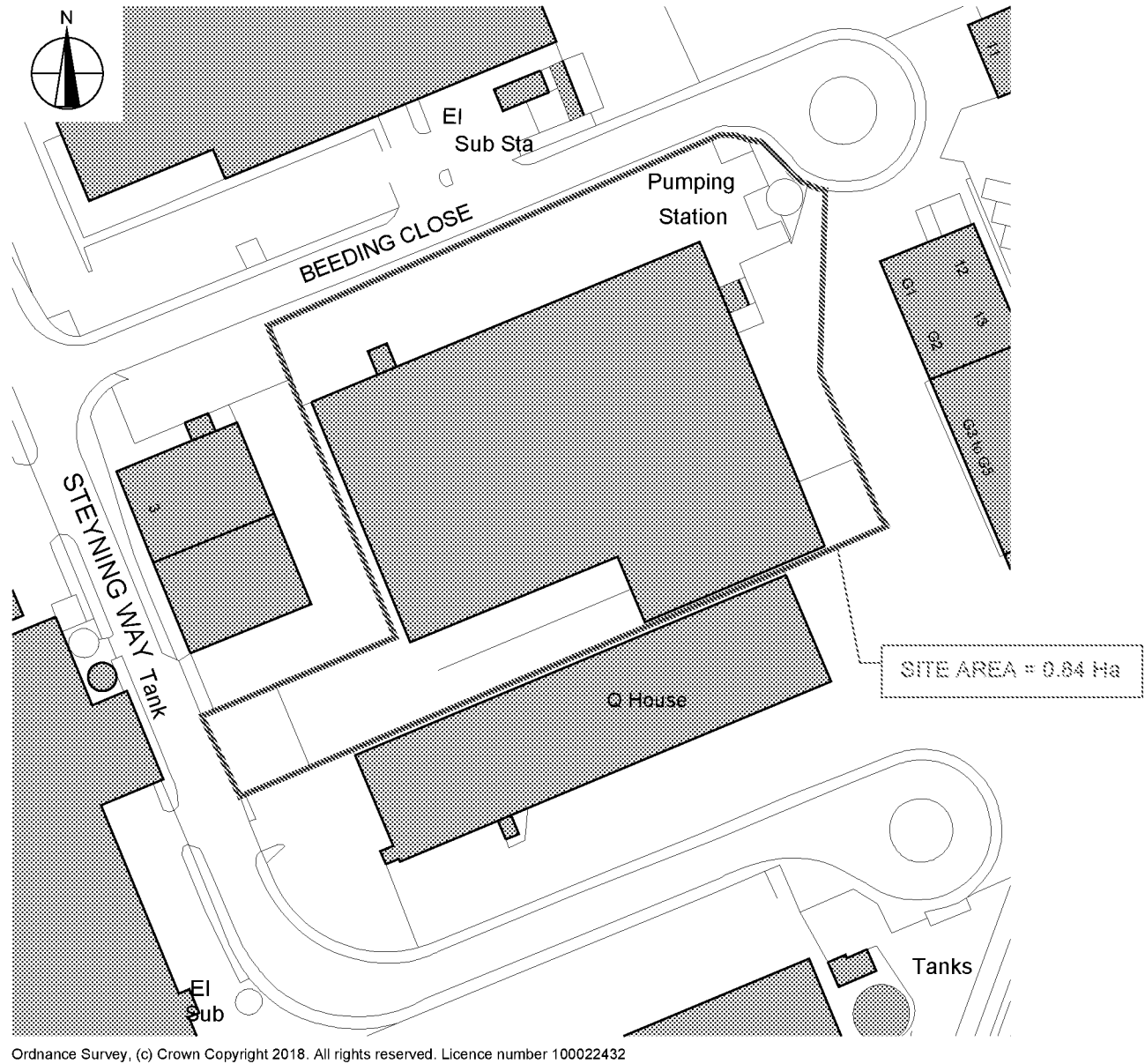
P1 07.12.18 Initial Issue
REV DATE DESCRIPTION

SB PC
DRN CHK

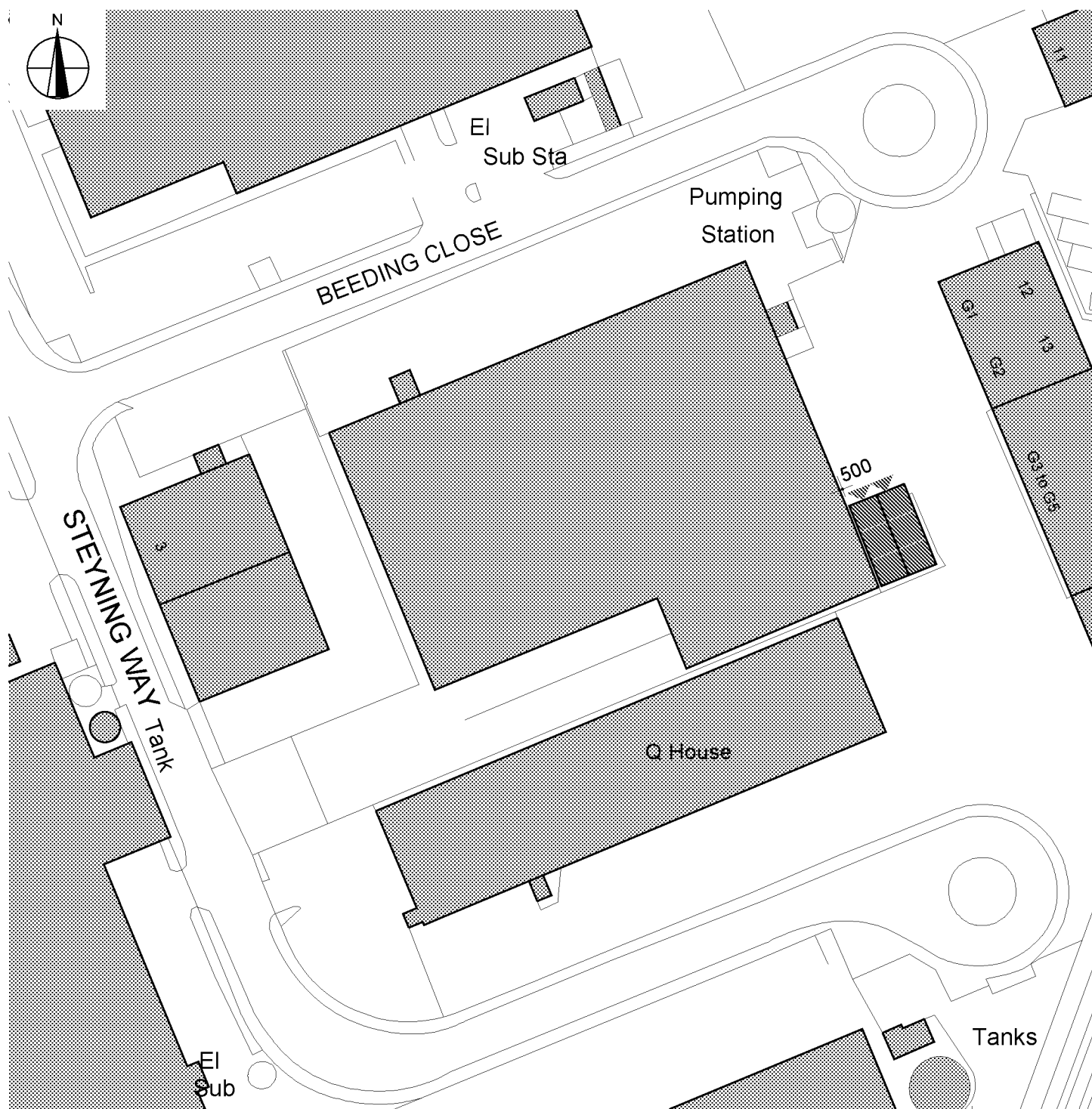
CLIENT JCC Lighting Products Ltd		PROJECT TITLE Beeding CI Bognor Regis	
DRAWING TITLE Site Location Plan		DRAWING PURPOSE PLANNING	
DRAWN / CHECKED SB/PC		DATE Dec' 2018	SCALE 1:1250@A4
JOB No 1MO38	DRAWING No 1MO38-MHA-FS-00-DR-A-01-001	STATUS --	REVISION P1



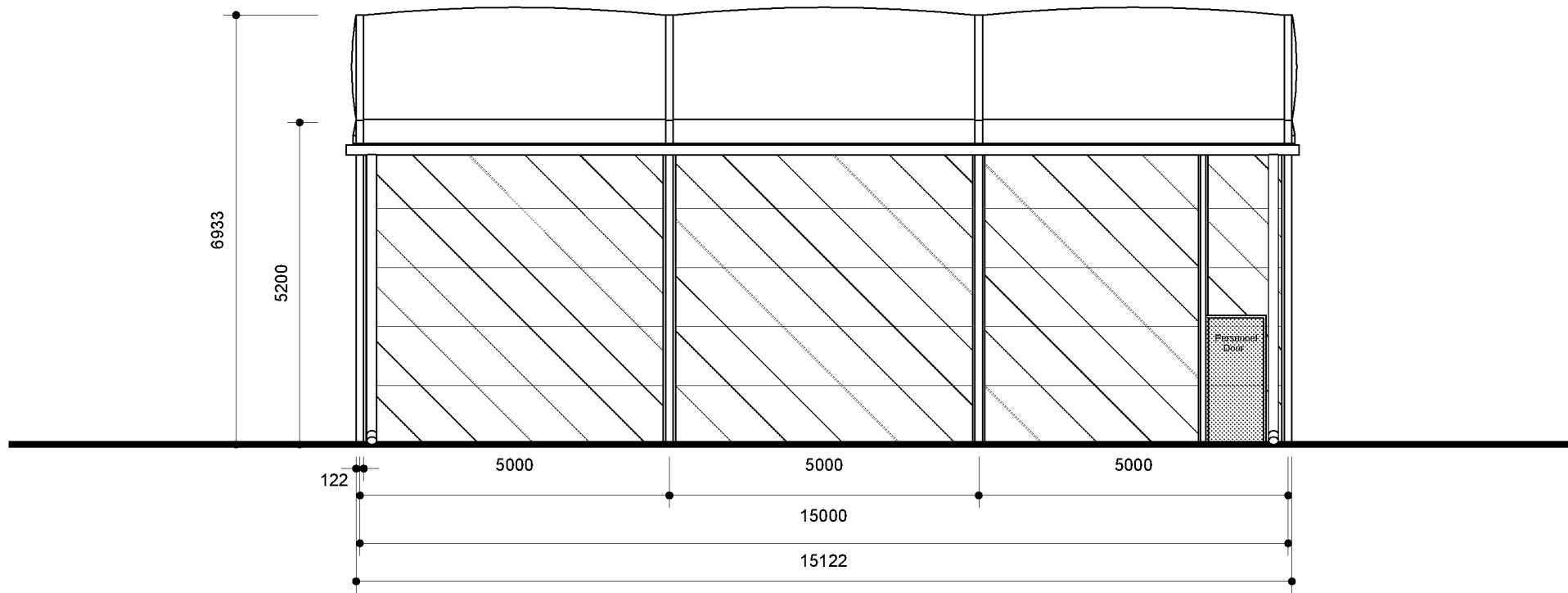
Proposed Plan 1:100



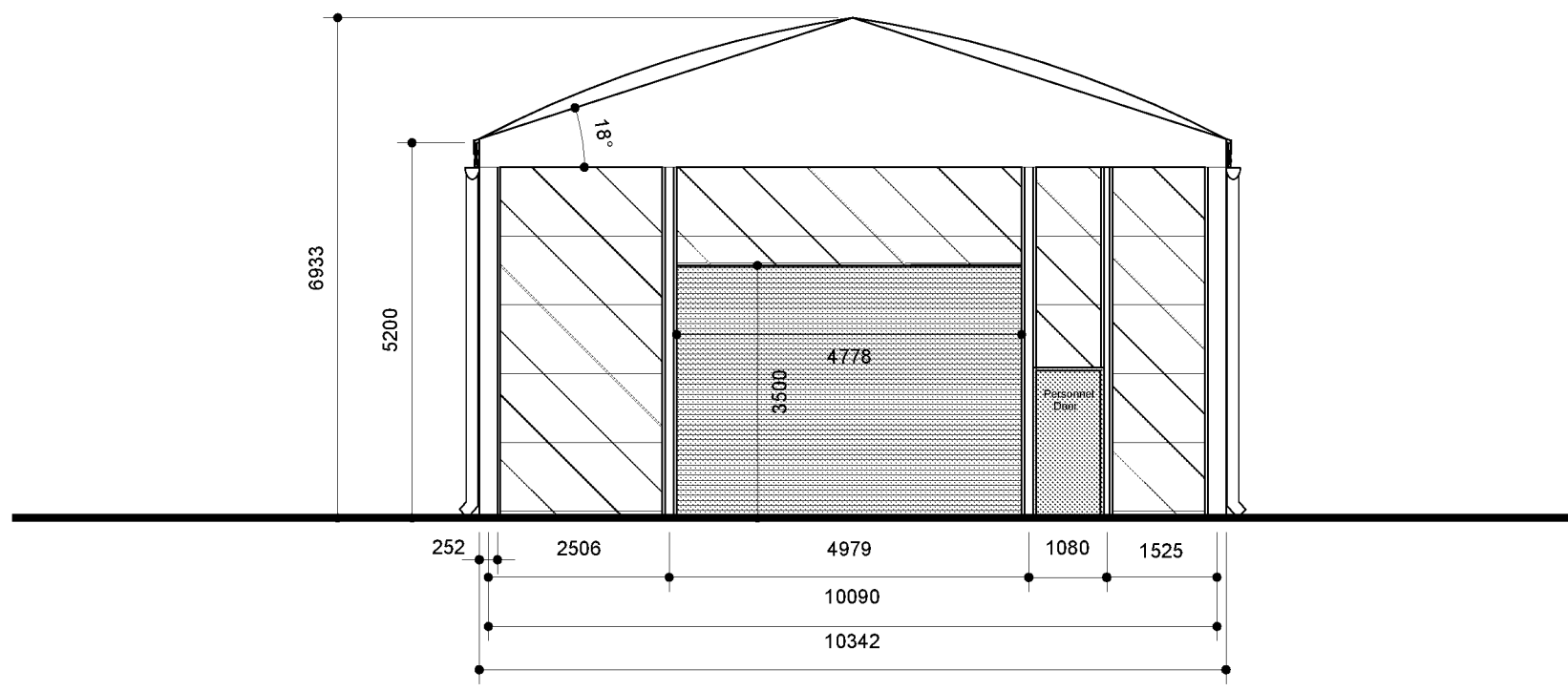
Location Plan 1:1250



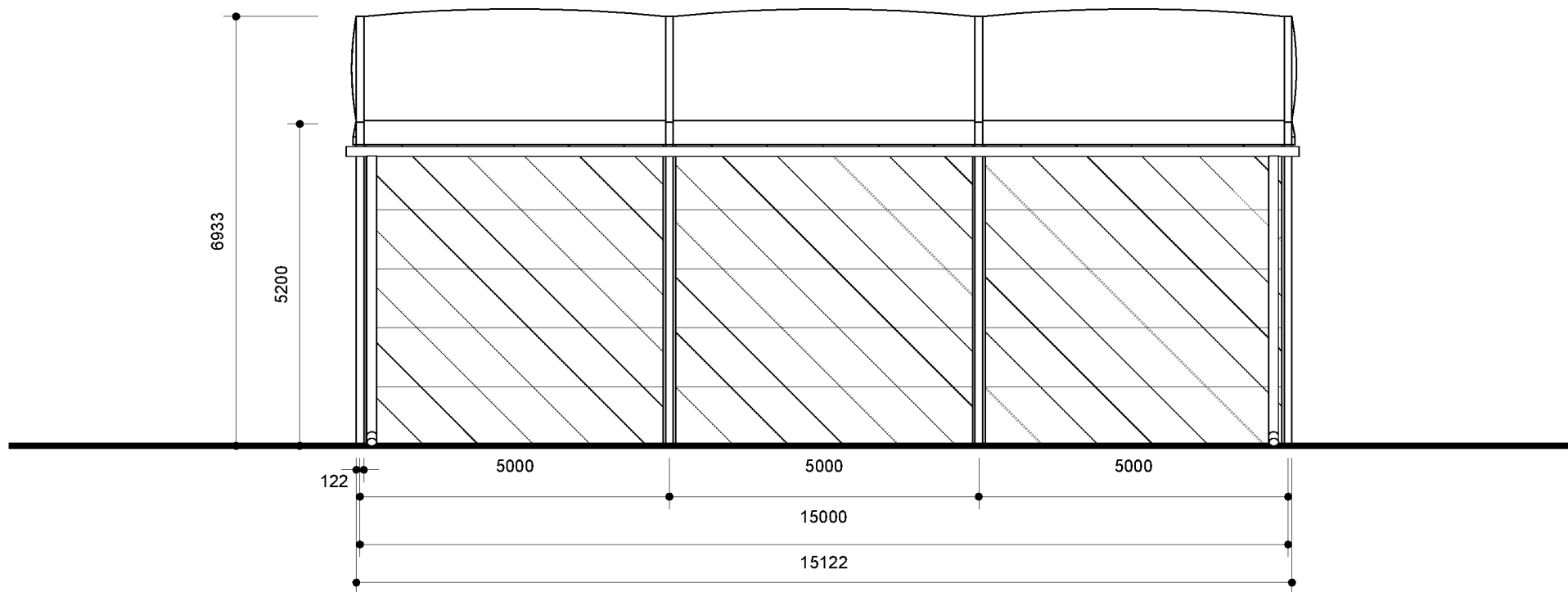
Proposed Site Plan 1:1000



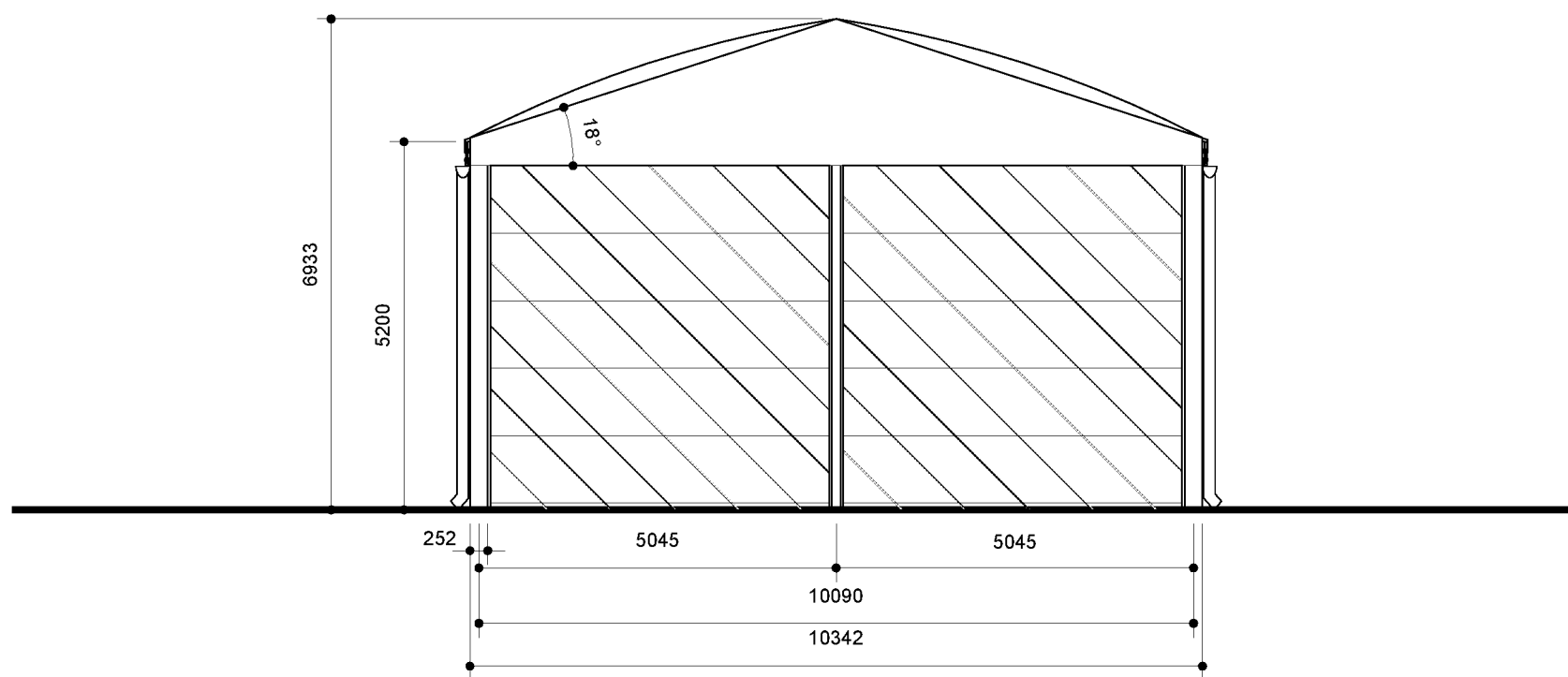
Elevation A



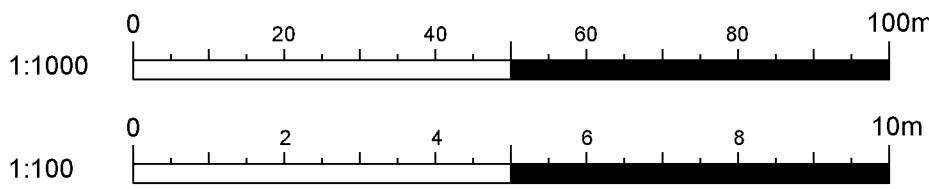
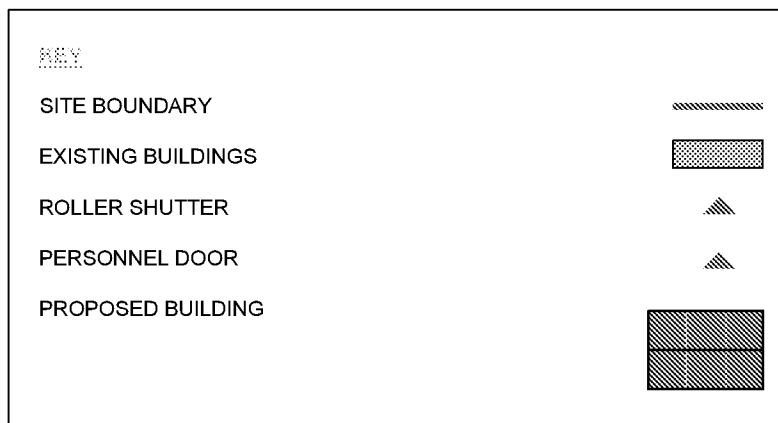
Elevation B



Elevation C



Elevation D



Appendix B

Commercial in Confidence

Unda Consulting Limited, Southpoint, Old Brighton Road, Gatwick, RH11 0PR

From: Laura Gibbons
Sent: 22 January 2019 11:56
To: Planning.Responses
Cc: Richard Castro-Parker
Subject: RE: Planning Consultation on: BE/139/18/PL

Engineers Comments Regarding Surface Water Drainage

The proposals are to drain surface water on to new hardstanding and into existing linear drainage channels. The efficacy of the drainage channels to accept these flows has not been determined. Furthermore, these proposals do not follow the hierarchy for sustainable drainage. They are not acceptable.

Please apply **ENG D2B**.

Infiltration must be investigated.

Infiltration rates for soakage structures are to be based on percolation tests undertaken in the winter period and at the location and depth of the proposed structures. The percolation tests must be carried out in accordance with BRE 365, CIRIA R156 or a similar approved method and cater for the 1 in 10 year storm between the invert of the entry pipe to the soakaway, and the base of the structure. It must also have provision to ensure that there is capacity in the system to contain below ground level the 1 in 100 year event plus 40% on stored volumes, as an allowance for climate change. Adequate freeboard must be provided between the base of the soakaway structure and the highest recorded annual groundwater level identified in that location.

Any SuDS or soakaway design must include adequate groundwater monitoring data to determine the highest winter groundwater table in support of the design. The applicant is advised to discuss the extent of groundwater monitoring with the Council's Engineers. Supplementary guidance notes are also enclosed for information.

Regards,

Laura Gibbons, MEng, GMICE
Engineer (Drainage & Coastal)

Laura Gibbons | Engineer (Drainage & Coastal), Engineering Services, Arun District Council | Location: First Floor, Arun Civic Centre,
Maltravers Road, Littlehampton, BN17 5LP
Internal: 37818 | External: +44 (0) 1903 737818 | Fax: +44 (0) 1903 716018 | E-mail: laura.gibbons@arun.gov.uk
Arun is Working in Partnership with Chichester District Council
Visit Arun's web site at <http://www.arun.gov.uk/> and www.chichester.gov.uk



Save the environment - think before you print.

From: planning.responses@arun.gov.uk [mailto:planning.responses@arun.gov.uk]

Sent: 21 December 2018 11:33

To: Land Drainage

Subject: Planning Consultation on: BE/139/18/PL

To: **Engineers (Drainage)**

NOTIFICATION FROM ARUN DISTRICT COUNCIL

Town & Country Planning Act 1990 (as amended)

Town and Country Planning (Development Management Procedure) (England) Order 2015

Planning Permission

APPLICATION **BE/139/18/PL**

NO:

Registered: 18th December
2018

Site Address: Innovation Centre Beeding Close Bersted PO22 9TS

Grid Reference: 494337 101257

Description of Works: Erection of an industrial building ancillary to existing operations.

The Council have received the above application. I shall be pleased to receive any observations you may wish to make.

[Click here to view the application details](#)

Should you have any comments to make, these should be sent by replying to this email by 31-JAN-19.

You can also monitor the progress of this application through the Council web site:
www.arun.gov.uk/planning

Please be aware that any comments you may make will be available on our website so please do not insert personal details or signatures on your reply.

In the absence of a reply within the period stated, I shall assume that you have no observations to make.

The application will be determined having regard to the development plan policies (if any are relevant) and other material considerations. The development plan can be accessed via the website as can the leaflet which deals with material planning considerations.

Should the application go to appeal the Planning Inspectorate will publish any comments made to the Council on their website:

www.planningportal.gov.uk/planning/appeals/ but they will protect personal details.

The officer dealing with this application is Richard Castro-Parker who can be contacted on telephone number 01903 737643.

Regards
Planning Officer

consultee_email

Supplementary Requirements for Surface Water Drainage Proposals

Any proposed surface water scheme must consider sustainable drainage principles.

SuDS Selection

The following destinations must be considered for surface runoff in order of preference:

1. Discharge into the ground (infiltration);
2. Controlled discharge to a surface water body;
3. Controlled discharge to a surface water sewer.

Surface water must not be discharged into the foul sewer system. Infiltration structures include soakaways, basins, swales and permeable paving. Discharge to surface water bodies and surface water sewers must be restricted to an agreed rate.

SuDS selection hierarchy based on:

CIRIA C753 - The SuDS Manual

BS8582:2013 – Code of Practice for Surface Water Management for Development Sites

Approved Document H of the Building Regulations

For additional guidance, please refer to the 'West Sussex County Council (Lead Local Flood Authority) Policy For The Management of Surface Water'

https://www.westsussex.gov.uk/media/12230/ws_lfa_policy_for_management_of_surface_water.pdf

Infiltration Drainage Design

Infiltration rates for soakage structures are to be based on percolation tests undertaken in the winter period at the location and depth of the proposed structures. The percolation tests must be carried out in accordance with BRE 365, CIRIA R156 or a similar approved method, and cater for the 1 in 10 year storm event between the invert of the lowest entry pipe into the infiltration structure and the base. For the purpose of design, the percolation rate must be applied to the sides of the infiltration structure only and the rate for the base must be zero. This does not apply to infiltration basins or permeable pavements, whereby the percolation rate is applied to the base only. There must be provision to ensure that there is capacity in the system to contain the 1 in 100 year storm event plus 40% on stored volumes, as an allowance for climate change. The infiltration structure should also drain 50% of its total volume in 24 hours or less for both the 1 in 10 and 1 in 100 year (plus 40%) storm events, in order to provide spare capacity for subsequent storms.

Any infiltration drainage design must include adequate winter groundwater monitoring data to determine the highest winter groundwater table. Residential developments in excess of five properties will require ground water monitoring to be carried out between October and

March inclusive. The extent of monitoring required for smaller developments will be subject to agreement with the Council's Engineers.

Adequate freeboard must be provided between the base of the soakaway structure and the highest recorded groundwater level identified in that location.

Restricted Discharge

Discharge to a watercourse or surface water sewer must be restricted to the estimated mean greenfield runoff rate (Q_{bar}) by means of a controlled outflow (or restricted to existing runoff rates for brownfield sites). This can be derived from IH124 or a similar approved method. Any storage design must be submitted with groundwater monitoring data where applicable to ensure there will be no detrimental effect on the structure or storage. Storage areas are preferred to be in an 'open' form such as ponds, rather than underground tanks.

Flow Exceedance Routes

The drainage design should show flow routes through the proposed development, demonstrating where surface water will be conveyed for three types of flow:

1. Low flow routes

Regular flow from source control features such as permeable pavements should travel in low flow channels through the development in a controlled way contributing to landscape quality.

2. Overflows

In the event of local blockages or surcharge a simple overflow arrangement should allow water to bypass the obstruction and return to the management train sequence until conditions return to normal.

3. Exceedance routes

When SuDS are overwhelmed by exceptional rainfall, then exceedance routes are required to protect people and property. These provide unobstructed overland flow routes from the development and should be considered for all drainage schemes. Exceedance routes should also be protected from future changes in land use.

Culverting a Watercourse

Culverting (piping) a watercourse is not advised unless there is no alternative. The resulting reduction in storage volume, flow capacity and habitat potential would be unacceptable. Culverted watercourses are also more difficult to maintain due to the limited accessibility.

Land Drainage Consent must be sought from the Lead Local Flood Authority (West Sussex County Council), or its agent (Arun District Council – land.drainage@arun.gov.uk), prior to starting any works (temporary or permanent) that affect the flow of water in the watercourse. Such works may include culverting, channel diversion, discharge of flows, connections, headwalls and the installation of trash screens.

Please also refer to the 'culvert policy' and consent application form available on the West Sussex County Council website; <https://www.westsussex.gov.uk/fire-emergencies-and-crime/dealing-with-extreme-weather/dealing-with-flooding/flood-risk-management/ordinary-watercourse-land-drainage-consent/>

The development layout must take account of any existing watercourses (open or culverted) to ensure that future access for maintenance is not restricted.

See also:

Land Drainage Act 1991 (amended 1994)

Maintenance and Management

Ditches and watercourses (including culverts) should retain a three metre easement with access that allows for its future maintenance.

Details of the maintenance and management of the SuDS system are to be set out in writing in a site specific maintenance manual. This manual shall include details of the financial management and arrangements for the replacement of components at the end of the manufacturers recommended design life. This document is then to be submitted as part of the planning process.

References

The Building Regulations 2000
Drainage and waste disposal
Approved document H
ISBN: 1-859462-08-1

Building Research Establishment,
Soakaway Design – Digest 365 (BRE 365)
ISBN: 1 86081 604 5, 1991

Centre for Ecology and Hydrology
Flood Estimation for Small Catchments - IH Report 124
Marshall, D.C.W. & Bayliss, A.C.
ISBN: 0948540621, 1994

CIRIA
C697 The SUDs Manual
Woods-Ballard, B.; Kellagher, R. et al
ISBN: 978-0-86017-697-8, 2007

CIRIA
R156 Infiltration Drainage – Manual of Good Practice
Bettess, R.
ISBN: 0 86017 457 3

British Standards Institution
BS8582:2013 – Code of Practice for Surface Water Management for Development Sites
ISBN: 978 0 580 76700 5

Version Dated; 6th December 2018



Surface Water Drainage Proposal Checklist

Foreword

Before completing this checklist you are advised to read “Arun/Chichester District Council Supplementary Requirements for Surface Water Drainage Proposals”.

The Surface Water Drainage Proposals Checklist is designed to clearly outline Arun/Chichester District Council’s expectations and requirements for Surface Water Drainage Proposals and to expedite their review. This document should be used when completing Discharge of Conditions Applications or if the applicant wishes to avoid pre-commencement conditions relating to surface water drainage.

The Town and Country Planning Regulations now require pre-commencement conditions to have the prior agreement of the applicant regarding their wording and use. If an applicant wishes to avoid surface water drainage pre-commencement conditions they will need to submit detailed surface water drainage proposals in line with the Surface Water Drainage Proposal Checklist.

The below details are required to enable Arun/Chichester District Council to examine if proposals follow the hierarchy for sustainable drainage and if the design will adequately drain the site.

N.B. It will be difficult for Arun/Chichester District Council to undertake an appropriate and therefore timely assessment of your application if you answer “no” to any of the questions below, or if you fail to provide any of the information requested.

Checklist

Winter groundwater monitoring results included	Y/N
Winter infiltration test results included	Y/N
Period of winter groundwater monitoring	
Maximum recorded groundwater level (AOD)	
Date of infiltration testing	
Depth of infiltration testing	
Minimum infiltration rate recorded (At location of infiltrating structure)	
Plan showing the location of winter groundwater monitoring and infiltration testing included	Y/N
Method of surface water disposal proposed (Delete as appropriate)	Infiltration / Attenuation with discharge to watercourse / Attenuation with discharge to surface water sewer / Attenuation with discharge to foul sewer
If infiltration is <u>not</u> to be used: Justification supplied	Y/N
If infiltration is proposed: half drain time for 10 year event + climate change allowance (hours)	

If infiltration is proposed: half drain time for 100 year event + climate change allowance (hours)			
If infiltration is proposed: lowest base level of infiltrating structure			
If attenuation is proposed: calculations of pre-development runoff rates included *	Y/N	Rate	l/s
If attenuation is proposed: is proposed discharge rate less than or equal to pre-development rate?*	Y/N	Rate	l/s
Calculations included demonstrating that the 1 in 100 year plus climate change event can be accommodated on site**	Y/N		
If proposing an impermeable lined attenuation feature/s, calculations included demonstrating that resistance to floatation (due to groundwater levels) is achieved and catered for in the design	Y/N/Not applicable		
If alterations or discharge to an ordinary watercourse is proposed: has Ordinary Watercourse Land Drainage Consent been sought?	Y/N		
Drainage layout plans included***	Y/N		
Construction detail plans included****	Y/N		
Exceedance flow route plans included (Not required for <5 properties)	Y/N/Not applicable		

*If developing brownfield sites, please provide fully detailed plans of the existing surface water drainage arrangements on site, including impermeable areas, gullies, outfalls, pipes & diameters, manholes, etc.

**If infiltration is proposed the following factor of safety should be applied to calculations (in accordance with CIRIA R156/ CIRIA C609)

Size of Area to be Drained	Consequences of failure					
	No damage or inconvenience		Minor inconvenience, e.g. surface water on car park		Damage to buildings or structures or roads.	
	Cv=1.0	Cv=0.75	Cv=1.0	Cv=0.75	Cv=1.0	Cv=0.75
<100 m ²	1.5	2	2	3	10	13
100m ² to 1000m ²	1.5	2	3	4	10	13
>1000m ²	1.5	2	5	6.5	10	13



***Please note that drainage layout plans should include:

- All surface water drainage pipes labelled with; diameters, pipe materials, falls and invert levels.
- All infiltrating and attenuating structures (including permeable paving) labelled with; dimensions, invert and cover levels.
- All manholes labelled with; cover levels, invert levels, cover types detailed.
- All silt traps clearly labelled with sump depths.
- Control structures with outflow rates and invert levels.
- Proposed/existing levels of any areas subject to ground raising, together with suitable measures/detailed drawings for the associated managing of surface water runoff. Please note that ground raising should be avoided unless there are exceptional circumstances.

****If your proposed drainage scheme includes any of the following elements site specific construction detail plans should be supplied: pipe bed and surround; infiltrating structures; attenuating structures; manholes; catchpits/silt traps; control devices; permeable paving; headwalls.

Dear Samantha,

Here is the drainage condition as previously discussed:

Development shall not commence until full details of the proposed surface water drainage scheme have been submitted to and approved in writing by the Local Planning Authority.

The design should follow the hierarchy of preference for different types of surface water drainage disposal systems as set out in Approved Document H of the Building Regulations, the recommendations of the SUDS Manual produced by CIRIA.

Winter groundwater monitoring to establish highest annual ground water levels and Percolation testing to BRE 365, or similar approved, will be required to support the design of any Infiltration drainage.

No building shall be occupied until the complete surface water drainage system serving the property has been implemented in accordance with the agreed details and the details so agreed shall be maintained in good working order in perpetuity.

Reason : To ensure that the proposed development is satisfactorily drained in accordance with policies W SP1, W DM1, W DM2 and W DM3 of the Arun Local Plan. This is required to be a pre-commencement condition because it is necessary to implement the surface water drainage system prior to commencing any building works

Yours sincerely

Richard Castro-Parker

Senior Planning Officer (Contract)
Arun District Council.

From: Samantha Lee [REDACTED]
Sent: 11 February 2019 11:55
To: 'richard.castro-parker@arun.gov.uk' <richard.castro-parker@arun.gov.uk>
Cc: Andrew Jalali <[REDACTED]>
Subject: BE/139/18/PL - JCC Light Planning application

Hi Richard,

I've tried to ring you just now but you were unavailable.

We are the agents for the above mentioned planning application. I have just seen the drainage response and would like to find out how you are going to receive the response. If a condition is to be proposed, could we see the drafting wording of the condition please?

Thanks,

Samantha

Samantha Lee

Planner



Registered in England No 06018747 at above address

<http://www.arun.gov.uk>

DX 57406 Littlehampton

You can view Arun District Council's Privacy Policy from <https://www.arun.gov.uk/privacy-policy>

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Appendix C

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Unda Consulting Limited, Southpoint, Old Brighton Road, Gatwick, RH11 0PR



Unda Consulting Ltd
Southpoint
Gatwick
RH11 0PR

Your ref 88684
Our ref 328950
Date 22 February 2019
Contact 

Attention: Thomas Smith

Dear Customer

Re: Provision of public sewer record extract

**Location: Innovation Centre, Beeding Close, Bersted, West Sussex,
PO22 9TS**

Thank you for your order regarding the provision of extracts of our sewer and/or water main records. Please find enclosed the extracts from Southern Water's records for the above location.

We confirm payment of your fee in the sum of £49.92 and enclose a VAT receipt for your records.

Customers should be aware that there are areas within our region in which there are neither sewers nor water mains. Similarly, whilst the enclosed extract may indicate the approximate location of our apparatus in the area of interest, it should not be relied upon as showing that further infrastructure does not exist and may subsequently be found following site investigation. Actual positions of the disclosed (and any undisclosed) infrastructure should therefore be determined on site, because Southern Water does not accept any responsibility for inaccuracy or omission regarding the enclosed plan. Accordingly it should not be considered to be a definitive document.

Should you require any further assistance regarding this matter, please contact the LandSearch team.

Yours faithfully

LandSearch

VAT receipt

Ordered by:

Unda Consulting Ltd
Southpoint
Gatwick
RH11 0PR

VAT registration number: 813 0378 56
Order reference: 328950
Your reference: 88684

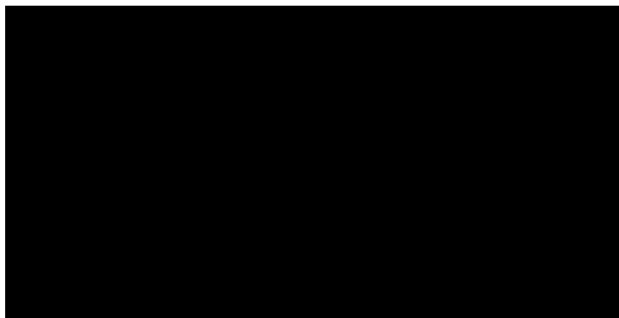
Receipt for provision of an extract from the public sewer and/or water main records.

Location	Costs
Innovation Centre Beeding Close Bersted West Sussex PO22 9TS	£41.60
Net total	£41.60
VAT	£8.32
Total	£49.92
Paid	Paid in full

Thank you for your payment:

Received on: 21 February 2019

For enquiries regarding the information provided in this receipt, please contact the LandSearch team:

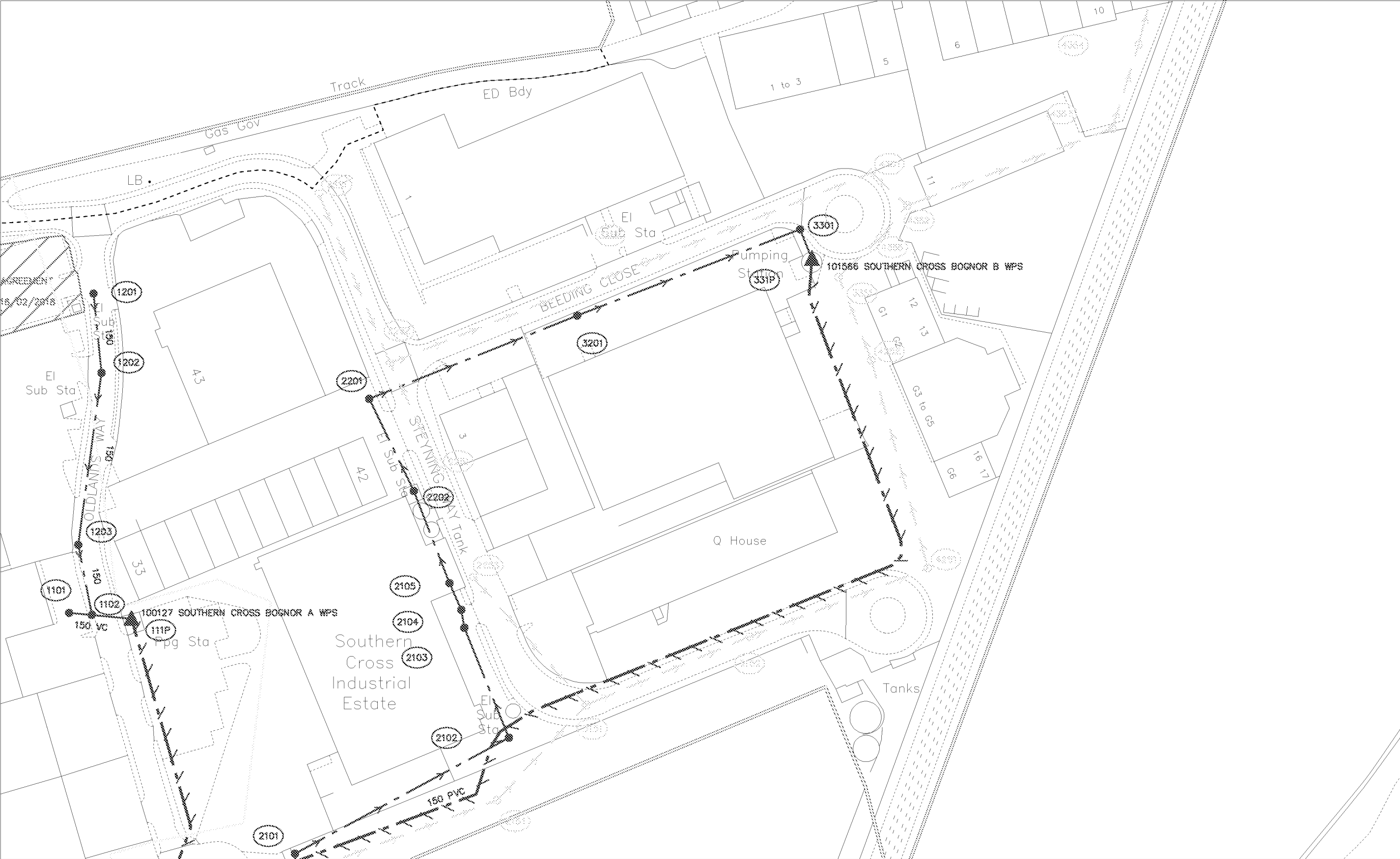


LandSearch
Southern Water Services
Southern House
Capstone Road
Chatham
Kent
ME5 7QA



SEWER RECORDS PAGE 1 OF 2

101395



101106

494109 494580	O.S. REF.	Drawn by: yadavsa	The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. WARNING: BAC pipes are constructed of Bonded Asbestos Cement WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.	
	SU9401SW	Scale: 1:1250		
	Title: 328950_Innovation Centre, Beed	Date: 22/02/2019		

SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
1101X	3.82	1.4	150	VC	CIRC																		
1102X	3.88	1.4	150	VC	CIRC																		
111PX	3.85	3.85	100	PVC	CIRC																		
1201X	3.64	2.29	150	UNK	CIRC																		
1202X	3.725	2.07	150	UNK	CIRC																		
1203X	3.785	1.59	150	UNK	CIRC																		
2101X	3.62	2.05	150	VC	CIRC																		
2102X	3.6	1.28	150	VC	CIRC																		
2103X	3.44	0.88	150	VC	CIRC																		
2104X	3.31	0.79	150	VC	CIRC																		
2105X	3.44	0.71	150	VC	CIRC																		
2151X	3.67	2.31	450	CP	CIRC																		
2201X	3.21	-0.01	225	VC	CIRC																		
2202X	3.42	0.28	225	VC	CIRC																		
2251X	3.57	2.1	375	CP	CIRC																		
2252X	2.87	1.83	600	CP	CIRC																		
2253X			375	CP	CIRC																		
2351X	3.13	2.15	375	CP	CIRC																		
3151X	3.76	2	600	CP	CIRC																		
3152X	3.36	1.74	600	CP	CIRC																		
3201X	2.7	-0.51	225	VC	CIRC																		
3301X	2.68	-0.93	300	VC	CIRC																		
331PX	2.78	2.78	150	PVC	CIRC																		
3351X	3.32	1.24	750	CP	CIRC																		
3352X	2.64	1.38	675	CP	CIRC																		
4251X	3.09	1.51	675	CP	CIRC																		
4252X	3.18	1.28	750	CP	CIRC																		
4351X	2.96	1.23	750	CP	CIRC																		
4352X	2.88	1.01	900	CP	CIRC																		
4353X	2.49	0.87	900	CP	CIRC																		
4354X	2.4	0.85	900	CP	CIRC																		
4355X	3.01	1.41	750	CP	CIRC																		

LINE STYLES / COLOURS

Brown	----- Foul
	----- Foul Syphon Sewer
	----- Foul Vacuum Main
	----- Foul Rising Main
Red	----- Combined
	----- Combined Syphon Sewer
	----- Combined Rising Main
	----- Lateral Drain
Orange	----- Building Over Agreement Area
Dark Blue	----- Treated Effluent
Purple	----- Sludge
	----- Sewer Catchment
	----- Section 104 Area
Light Blue	----- Surface Water
	----- Surface Water Rising Main
Yellow	----- Private
Green	----- Access Shaft
	----- Decommissioned

MATERIALS

AK	Alkaline
BAC	Bonded Asbestos Cement
BRD	Block (Common)
BRE	Block (Engineering)
CC	Concrete Box Culvert
CI	Cast Iron
CO	Concrete (In-Situ)
CP	Concrete (Pre-Cast)
CSB	Concrete Segments (bolted)
CSU	Concrete Segments (unbolted)
DI	Ductile Iron
GRG	Glass Reinforced Concrete
GRP	Glass Reinforced Plastic
MAC	Masonry in regular Courses
MAR	Masonry in random Courses
PE	Polyethylene
PF	Pitch Fibre
PP	Polypropylene
PVC	Polyvinyl Chloride
RFW	Reinforced Plastic Matrix
SI	Spun Iron
ST	Steel
VC	Verified Clay
XXX	Other
ZZZ	Unknown

Manhole (SW)
Manhole (F&C)
Lamp hole (SW)
Lamp hole (F&C)
Pumping Station (SW)
Pumping Station (F&C)
Side entry manhole (SW)
Side entry manhole (F&C)
Blind shaft (SW)
Blind shaft (F&C)
Ejector station (SW)
Ejector station (F&C)
Watertight door (SW)
Watertight door (F&C)
Flushing ch. Min-e (SW)
Flushing ch. Min-e (F&C)
Flushing ch. No-e (SW)
Flushing ch. No-e (F&C)
Demonstration Chamber

LEGEND - SEWERS

Washout (SW)
Washout (F&C)
Rodding Eye (SW)
Rodding Eye (F&C)
Gauging point (SW)
Gauging point (F&C)
Intercept chamber (SW)
Intercept chamber (F&C)
Storm Tank (SW)
Storm Tank (F&C)
Vortex chamber (SW)
Vortex chamber (F&C)
Label ellipse
Dummy/S24 manhole
Outfall
Penstock chamber
Demiboards
Storm Overflow
Backdrop manhole

Other (s)
Other
Change In sewer (s)
Change In sewer
Rafflux valve
Flap valve
Cascade
Anode
Valve
Closed Valve
Air Valve
Hatch box (SW)
Hatch box (F&C)
Direction arrow
Emptying valve
Catchpit
Soskaway
Inlet
Balancing Pond

Wastewater treatment works
Marine treatment works
Outfall headworks
Vent
Vent column
Tidal storage tank
Blank end
Head of Public Sewer
Micro Pumping Station

SHAPES (S)

A	Arched	R	Rectangular
B	Barrel	S	Square
C	Circular	T	Trapezoidal
E	Egg	U	U Shape
H	Horseshoe	X	Other

NODE REFERENCING SYSTEM

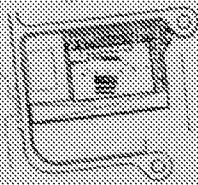
1st digit:	hundred metre easting identifier
2nd digit:	hundred metre northing identifier
3rd digit:	sewer type identifier
4th digit:	next sequential node

Drawn by: yadavs

Title: 328950_Innovation Centre, Beed

Date: 22/02/2019





KEY PLAN



- NOTE:
1. REVERSE EXISTING CHANNELS TO SUIT NEW DRAINAGE
 2. DRAINAGE SHALL BE COMPLETED PRIOR TO THE START OF CONSTRUCTION OF THE BUILDING
 3. ALL NEW AND EXISTING CHANNELS SHALL BE CONSTRUCTED TO SUIT THE DRAINAGE SYSTEM
 4. DRAINAGE SHALL BE COMPLETED PRIOR TO THE START OF CONSTRUCTION OF THE BUILDING

NOTE: DRAINAGE CONSTRUCTION SHALL BE COMPLETED PRIOR TO THE START OF CONSTRUCTION OF THE BUILDING

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Bedford Estates Partnership
 10 BEDFORD ESTATES PARTNERSHIP
 10 BEDFORD ESTATES PARTNERSHIP
 10 BEDFORD ESTATES PARTNERSHIP

SOUTHERN CROSS
 TRADING ESTATE

DRAINAGE
 GENERAL ARRANGEMENT

Scale: 1:1000
 Date: 10/10/2007
 Drawn by: J. J.
 Checked by: J. J.

6056/BD

Appendix D

Commercial in Confidence

Unda Consulting Limited, Southpoint, Old Brighton Road, Gatwick, RH11 0PR. [REDACTED]

Unda Consulting Ltd		Page 1
Southpoint Old Brighton Road Gatwick RH11 0PR	Greenfield Runoff Industrial Development Innovation Centre, Bersted	
Date 20/02/2019 File	Designed by TS Checked by EJ	
XP Solutions Source Control 2017.1		
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 100 Soil 0.400 Area (ha) 0.836 Urban 0.000 SAAR (mm) 709 Region Number Region 7 Results 1/s QBAR Rural 2.9 QBAR Urban 2.9 Q100 years 9.2 Q1 year 2.5 Q30 years 6.5 Q100 years 9.2		
©1982-2017 XP Solutions		

Unda Consulting Ltd		Page 1
Southpoint Old Brighton Road Gatwick RH11 0PR	Brownfield Runoff Industrial Development Innovation Centre, Bersted	
Date 20/02/2019 File	Designed by TS Checked by EJ	
XP Solutions Source Control 2017.1		
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 100 Soil 0.400 Area (ha) 0.836 Urban 0.750 SAAR (mm) 709 Region Number Region 7 Results l/s QBAR Rural 2.9 QBAR Urban 8.1 Q100 years 16.4 Q1 year 6.9 Q30 years 14.1 Q100 years 16.4		
©1982-2017 XP Solutions		

Unda Consulting Ltd		Page 1
Southpoint Old Brighton Road Gatwick RH11 0PR	Greenfield Runoff Development Area (150sq m) Innovation Centre, Bersted	
Date 20/02/2019 File	Designed by TS Checked by EJ	
XP Solutions Source Control 2017.1		
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 100 Soil 0.400 Area (ha) 0.015 Urban 0.000 SAAR (mm) 721 Region Number Region 7 Results l/s QBAR Rural 0.1 QBAR Urban 0.1 Q100 years 0.2 Q1 year 0.0 Q30 years 0.1 Q100 years 0.2		
©1982-2017 XP Solutions		

Unda Consulting Ltd				Page 1																																																																																																																																																																																																																			
Southpoint Old Brighton Road Gatwick RH11 0PR		Soakaway Sizing Assumed Rate																																																																																																																																																																																																																					
Date 08/05/2019 16:32 File soakaway assumed rate.SRCX		Designed by Thomas-Smith Checked by																																																																																																																																																																																																																					
XP Solutions		Source Control 2017.1.2																																																																																																																																																																																																																					
<u>Summary of Results for 100 year Return Period (+40%)</u> Half Drain Time : 1422 minutes. <table><thead><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr></thead><tbody><tr><td>15 min Summer</td><td>9.524</td><td>0.024</td><td>0.0</td><td>3.5</td><td>O K</td></tr><tr><td>30 min Summer</td><td>9.533</td><td>0.033</td><td>0.0</td><td>4.7</td><td>O K</td></tr><tr><td>60 min Summer</td><td>9.542</td><td>0.042</td><td>0.1</td><td>5.9</td><td>O K</td></tr><tr><td>120 min Summer</td><td>9.551</td><td>0.051</td><td>0.1</td><td>7.2</td><td>O K</td></tr><tr><td>180 min Summer</td><td>9.556</td><td>0.056</td><td>0.1</td><td>7.9</td><td>O K</td></tr><tr><td>240 min Summer</td><td>9.559</td><td>0.059</td><td>0.1</td><td>8.4</td><td>O K</td></tr><tr><td>360 min Summer</td><td>9.563</td><td>0.063</td><td>0.1</td><td>9.0</td><td>O K</td></tr><tr><td>480 min Summer</td><td>9.566</td><td>0.066</td><td>0.1</td><td>9.4</td><td>O K</td></tr><tr><td>600 min Summer</td><td>9.567</td><td>0.067</td><td>0.1</td><td>9.6</td><td>O K</td></tr><tr><td>720 min Summer</td><td>9.568</td><td>0.068</td><td>0.1</td><td>9.7</td><td>O K</td></tr><tr><td>960 min Summer</td><td>9.569</td><td>0.069</td><td>0.1</td><td>9.9</td><td>O K</td></tr><tr><td>1440 min Summer</td><td>9.570</td><td>0.070</td><td>0.1</td><td>10.0</td><td>O K</td></tr><tr><td>2160 min Summer</td><td>9.570</td><td>0.070</td><td>0.1</td><td>9.9</td><td>O K</td></tr><tr><td>2880 min Summer</td><td>9.568</td><td>0.068</td><td>0.1</td><td>9.7</td><td>O K</td></tr><tr><td>4320 min Summer</td><td>9.564</td><td>0.064</td><td>0.1</td><td>9.2</td><td>O K</td></tr><tr><td>5760 min Summer</td><td>9.560</td><td>0.060</td><td>0.1</td><td>8.6</td><td>O K</td></tr><tr><td>7200 min Summer</td><td>9.556</td><td>0.056</td><td>0.1</td><td>8.0</td><td>O K</td></tr><tr><td>8640 min 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Summer</td><td>9.966</td><td>0.0</td><td>600</td></tr><tr><td>720 min Summer</td><td>8.665</td><td>0.0</td><td>720</td></tr><tr><td>960 min Summer</td><td>6.943</td><td>0.0</td><td>914</td></tr><tr><td>1440 min Summer</td><td>5.071</td><td>0.0</td><td>1138</td></tr><tr><td>2160 min Summer</td><td>3.696</td><td>0.0</td><td>1516</td></tr><tr><td>2880 min Summer</td><td>2.949</td><td>0.0</td><td>1932</td></tr><tr><td>4320 min Summer</td><td>2.142</td><td>0.0</td><td>2728</td></tr><tr><td>5760 min Summer</td><td>1.705</td><td>0.0</td><td>3520</td></tr><tr><td>7200 min Summer</td><td>1.427</td><td>0.0</td><td>4320</td></tr><tr><td>8640 min Summer</td><td>1.235</td><td>0.0</td><td>5016</td></tr><tr><td>10080 min Summer</td><td>1.093</td><td>0.0</td><td>5752</td></tr><tr><td>15 min Winter</td><td>124.633</td><td>0.0</td><td>19</td></tr></tbody></table>						Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	15 min Summer	9.524	0.024	0.0	3.5	O K	30 min 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Summer	14.706	0.0	362	480 min Summer	11.818	0.0	482	600 min Summer	9.966	0.0	600	720 min Summer	8.665	0.0	720	960 min Summer	6.943	0.0	914	1440 min Summer	5.071	0.0	1138	2160 min Summer	3.696	0.0	1516	2880 min Summer	2.949	0.0	1932	4320 min Summer	2.142	0.0	2728	5760 min Summer	1.705	0.0	3520	7200 min Summer	1.427	0.0	4320	8640 min Summer	1.235	0.0	5016	10080 min Summer	1.093	0.0	5752	15 min Winter	124.633	0.0	19
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1440 min Summer	5.071	0.0	1138																																																																																																																																																																																																																				
2160 min Summer	3.696	0.0	1516																																																																																																																																																																																																																				
2880 min Summer	2.949	0.0	1932																																																																																																																																																																																																																				
4320 min Summer	2.142	0.0	2728																																																																																																																																																																																																																				
5760 min Summer	1.705	0.0	3520																																																																																																																																																																																																																				
7200 min Summer	1.427	0.0	4320																																																																																																																																																																																																																				
8640 min Summer	1.235	0.0	5016																																																																																																																																																																																																																				
10080 min Summer	1.093	0.0	5752																																																																																																																																																																																																																				
15 min Winter	124.633	0.0	19																																																																																																																																																																																																																				
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Unda Consulting Ltd				Page 2	
Southpoint Old Brighton Road Gatwick RH11 0PR		Soakaway Sizing Assumed Rate			
Date 08/05/2019 16:32		Designed by Thomas-Smith			
File soakaway assumed rate.SRCX		Checked by			
XP Solutions		Source Control 2017.1.2			
<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	9.537	0.037	0.1	5.2	O K
60 min Winter	9.547	0.047	0.1	6.6	O K
120 min Winter	9.557	0.057	0.1	8.1	O K
180 min Winter	9.563	0.063	0.1	8.9	O K
240 min Winter	9.566	0.066	0.1	9.5	O K
360 min Winter	9.571	0.071	0.1	10.2	O K
480 min Winter	9.574	0.074	0.1	10.6	O K
600 min Winter	9.577	0.077	0.1	10.9	O K
720 min Winter	9.578	0.078	0.1	11.1	O K
840 min Winter	9.580	0.080	0.1	11.3	O K
960 min Winter	9.580	0.080	0.1	11.4	O K
1080 min Winter	9.578	0.078	0.1	11.2	O K
1200 min Winter	9.576	0.076	0.1	10.8	O K
1320 min Winter	9.570	0.070	0.1	9.9	O K
1440 min Winter	9.563	0.063	0.1	8.9	O K
1560 min Winter	9.556	0.056	0.1	8.0	O K
1680 min Winter	9.551	0.051	0.1	7.3	O K
1800 min Winter	9.548	0.048	0.1	6.8	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
30 min Winter	83.789	0.0	33		
60 min Winter	53.779	0.0	62		
120 min Winter	33.337	0.0	122		
180 min Winter	24.832	0.0	180		
240 min Winter	20.006	0.0	238		
360 min Winter	14.706	0.0	356		
480 min Winter	11.818	0.0	472		
600 min Winter	9.966	0.0	586		
720 min Winter	8.665	0.0	700		
840 min Winter	7.943	0.0	822		
960 min Winter	7.371	0.0	944		
1080 min Winter	6.943	0.0	1066		
1200 min Winter	6.643	0.0	1188		
1320 min Winter	6.443	0.0	1310		
1440 min Winter	6.306	0.0	1432		
1560 min Winter	6.221	0.0	1554		
1680 min Winter	6.188	0.0	1676		
1800 min Winter	6.193	0.0	1798		
1920 min Winter	6.235	0.0	1920		
2040 min Winter	6.312	0.0	2042		
2160 min Winter	6.427	0.0	2164		
2280 min Winter	6.579	0.0	2286		
2400 min Winter	6.766	0.0	2408		
2520 min Winter	6.988	0.0	2530		
2640 min Winter	7.245	0.0	2652		
2760 min Winter	7.537	0.0	2774		
2880 min Winter	7.864	0.0	2896		
3000 min Winter	8.227	0.0	3018		
3120 min Winter	8.627	0.0	3140		
3240 min Winter	9.064	0.0	3262		
3360 min Winter	9.537	0.0	3384		
3480 min Winter	10.046	0.0	3506		
3600 min Winter	10.591	0.0	3628		
3720 min Winter	11.172	0.0	3750		
3840 min Winter	11.789	0.0	3872		
3960 min Winter	12.443	0.0	3994		
4080 min Winter	13.134	0.0	4116		
4200 min Winter	13.862	0.0	4238		
4320 min Winter	14.627	0.0	4360		
4440 min Winter	15.430	0.0	4482		
4560 min Winter	16.271	0.0	4604		
4680 min Winter	17.150	0.0	4726		
4800 min Winter	18.067	0.0	4848		
4920 min Winter	19.023	0.0	4970		
5040 min Winter	20.018	0.0	5092		
5160 min Winter	21.053	0.0	5214		
5280 min Winter	22.128	0.0	5336		
5400 min Winter	23.243	0.0	5458		
5520 min Winter	24.398	0.0	5580		
5640 min Winter	25.593	0.0	5702		
5760 min Winter	26.828	0.0	5824		
5880 min Winter	28.103	0.0	5946		
6000 min Winter	29.418	0.0	6068		
6120 min Winter	30.773	0.0	6190		
6240 min Winter	32.168	0.0	6312		
6360 min Winter	33.603	0.0	6434		
6480 min Winter	35.078	0.0	6556		
6600 min Winter	36.593	0.0	6678		
6720 min Winter	38.148	0.0	6800		
6840 min Winter	39.743	0.0	6922		
6960 min Winter	41.378	0.0	7044		
7080 min Winter	43.053	0.0	7166		
7200 min Winter	44.768	0.0	7288		
7320 min Winter	46.523	0.0	7410		
7440 min Winter	48.318	0.0	7532		
7560 min Winter	50.153	0.0	7654		
7680 min Winter	52.028	0.0	7776		
7800 min Winter	53.943	0.0	7898		
7920 min Winter	55.898	0.0	8020		
8040 min Winter	57.893	0.0	8142		
8160 min Winter	59.928	0.0	8264		
8280 min Winter	61.993	0.0	8386		
8400 min Winter	64.088	0.0	8508		
8520 min Winter	66.213	0.0	8630		
8640 min Winter	68.368	0.0	8752		
8760 min Winter	70.553	0.0	8874		
8880 min Winter	72.768	0.0	8996		
9000 min Winter	75.013	0.0	9118		
9120 min Winter	77.288	0.0	9240		
9240 min Winter	79.593	0.0	9362		
9360 min Winter	81.928	0.0	9484		
9480 min Winter	84.293	0.0	9606		
9600 min Winter	86.688	0.0	9728		
9720 min Winter	89.113	0.0	9850		
9840 min Winter	91.568	0.0	9972		
9960 min Winter	94.053	0.0	10094		
10080 min Winter	96.568	0.0	10216		
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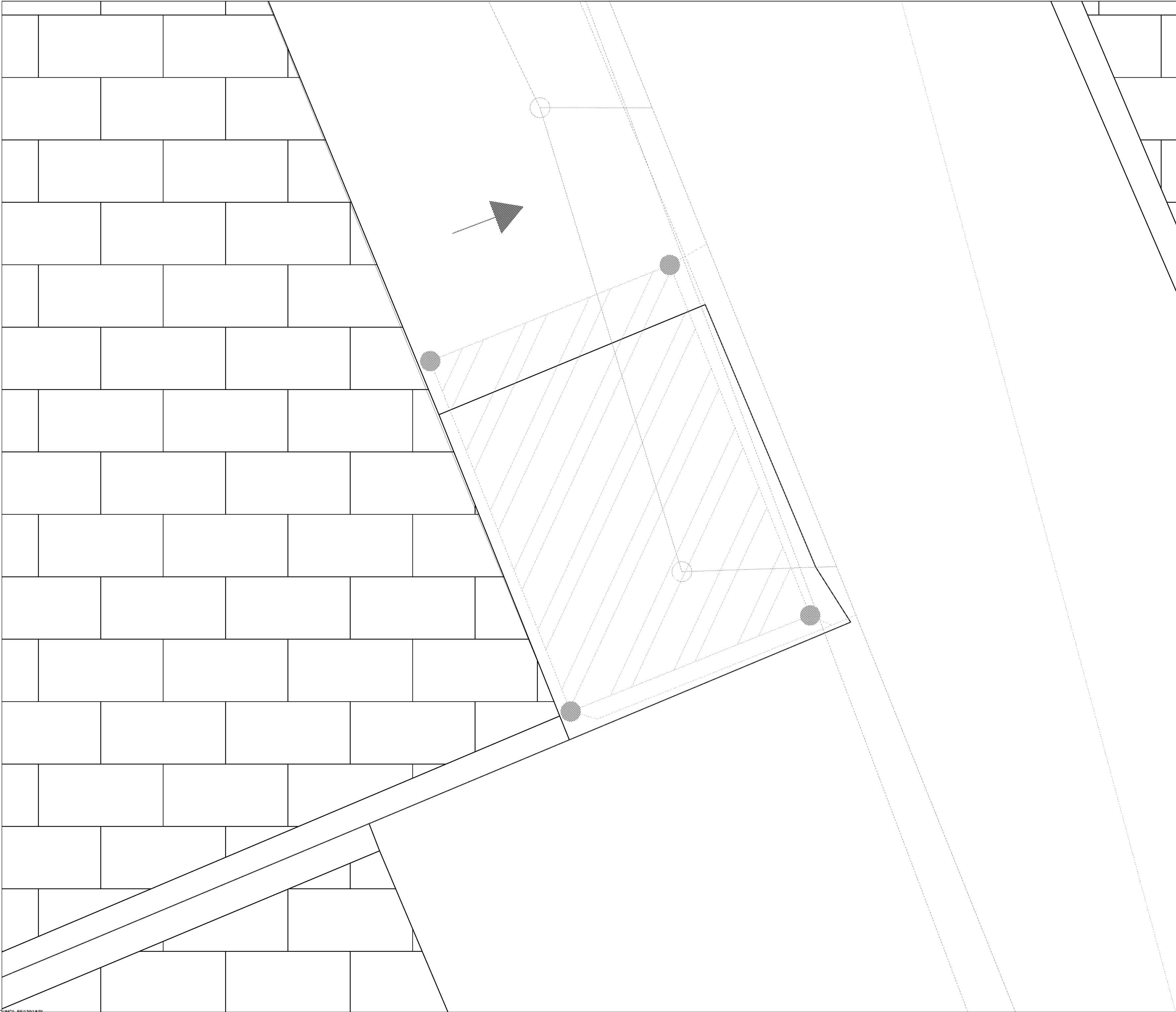
Unda Consulting Ltd		Page 3
Southpoint Old Brighton Road Gatwick RH11 0PR	Soakaway Sizing Assumed Rate	
Date 08/05/2019 16:32 File soakaway assumed rate.SRCX	Designed by Thomas-Smith Checked by	
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Source Control 2017.1.2		

Unda Consulting Ltd		Page 4																		
Southpoint Old Brighton Road Gatwick RH11 0PR	Soakaway Sizing Assumed Rate																			
Date 08/05/2019 16:32 File soakaway assumed rate.SRCX	Designed by Thomas-Smith Checked by																			
XP Solutions																				
Source Control 2017.1.2																				
<u>Model Details</u> Storage is Online Cover Level (m) 10.000 <u>Cellular Storage Structure</u> Invert Level (m) 9.500 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00360 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>150.0</td> <td>150.0</td> <td>0.600</td> <td>0.0</td> <td>150.0</td> </tr> <tr> <td>0.500</td> <td>150.0</td> <td>150.0</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	150.0	150.0	0.600	0.0	150.0	0.500	150.0	150.0			
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)															
0.000	150.0	150.0	0.600	0.0	150.0															
0.500	150.0	150.0																		
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Appendix E

Commercial in Confidence

Unda Consulting Limited, Southpoint, Old Brighton Road, Gatwick, RH11 0PR



Key

- Site Boundary
- New Industrial Building (150m²)
- Existing Industrial Buildings
- New Building Downpipes
- Proposed Surface Water Drainage
- Existing Private Drainage Arrangement
- Existing Private Surface Water Gully
- Existing Private Manhole Chambers
- Existing Southern Water Foul Sewer
- Existing Southern Water Surface Water Sewer
- Existing Southern Water Foul Manholes
- Existing Southern Water Surface Water Manholes
- Design Exceedance Route

Notes:

- Given the constraints associated with the site any intrusive works are considered disproportionate to the scale and nature of the development.
- Discharge of surface water via the existing surface water drainage arrangements at the site.
- All levels are in metres above ordnance datum

Client:
JCC Lighting Products Ltd

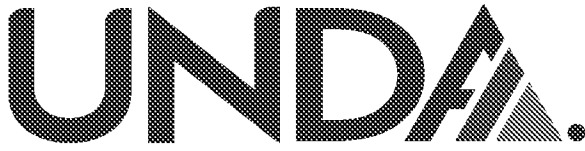
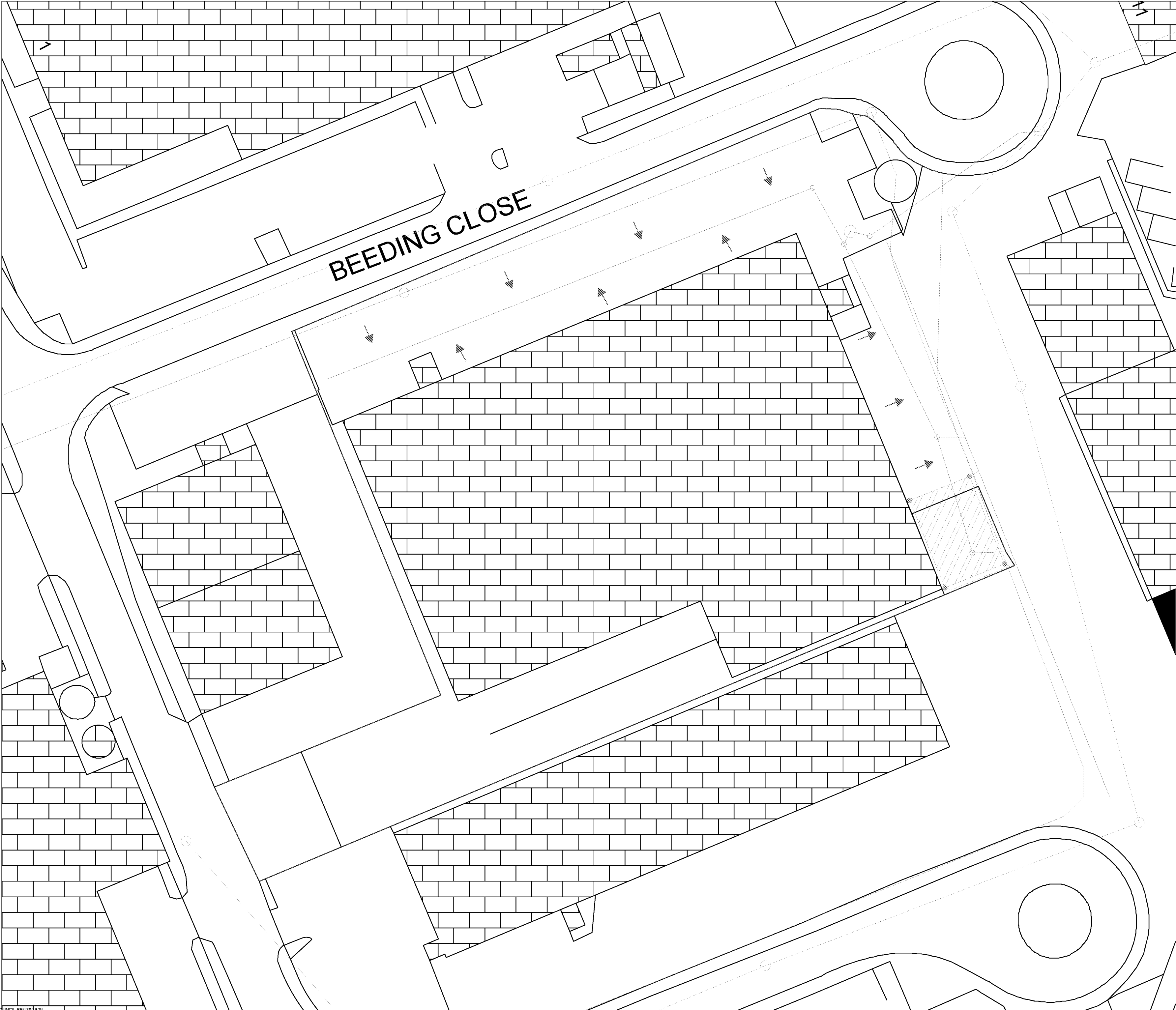
Site Address:
Innovation Centre,
Beeding Close,
Bersted
PO22 9TS

Job Reference: 88684-150219-MTP-Bersted	Date: 28-May-19
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Drawing Number: 88684-01	Revision: v1.0
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Designed by: TS	Drawn by: TS	Checked by: EJ
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Scale: 1:100@A2	Unda Consulting Ltd Southpoint Old Brighton Road Gatwick RH11 0PR
Disclaimer: The drawings provided are for planning purposes only.	



Key

- Site Boundary
- New Industrial Building (150m²)
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Drawing Number: 88684-01	Revision: v1.0
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Designed by: TS	Drawn by: TS	Checked by: EJ
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