SWSH Visioning Framework

Drainage Strategy for Planning

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Contents

1. Introduction 3
2. Planning Policy and Guidance 5
3. Existing Drainage 6
4. Proposed Surface Water Drainage 8
5. Impact on Existing Drainage Infrastructure 18
6. Conclusions 20

Figures

Figure 1: Site Location Plan 3
Figure 2: Ground Floor Geo-cellular Attenuation Area 14

Tables

Table 1: Existing Sewers 6
Table 2: Existing Site Condition 6
Table 3: Existing Discharge Rates 7
Table 4: SuDS Constraints and Opportunities 9
Table 5: Proposed Impermeable and Permeable Areas 10
Table 6: Proposed Discharge Rates 11
Table 7: Method of Discharge 11
Table 8: Proposed Impermeable Areas 12
Table 9: Proposed Discharge Rates 12
Table 10: Minimum Required Attenuation 13
Table 11: Potential Attenuation Volume 14
Table 12: Pollution Hazard Indices 15
Table 13: SuDS Mitigation Indices 15
Table 14: Sustainable Drainage Typical Maintenance Arrangements 16

Appendices

A. Topographic Survey
B. Development Proposals
C. Existing Drainage Assets
D. Drainage Strategy Plans
E. Surface Water Drainage Calculations
F. Sewer Diversion and Build Over Proposals
G. Surface Water Sewer Build Over
H. Alternative Foul Calculations

Executive Summary

Waterman Infrastructure and Environment have been commissioned by The Jersey Development Company Ltd (the 'Applicant') to prepare a Drainage Strategy for Planning for the proposed development of land off the Esplanade and A1 La Route de la Liberation, St. Helier, known as the SWSH Visioning Framework.

This report has been prepared to accompany an Outline planning application (with all matters reserved), comprising the demolish of existing structures and the phased construction of new development comprising up to 984 residential dwellings, retail and commercial uses, leisure, arts and cultural facilities, social infrastructure, public and private open spaces, basement car parking, new pedestrian and vehicular access and other associated landscape and infrastructure works including relocated slipway, works to the sea wall and reclamation of land to rear of realigned sea wall.

The existing surface water runoff rates from the Site for the 1 in 1 year and 1 in 100 year scenarios have been calculated to be 249.2 l/s and 802.8 l/s respectively.

In line with previous submissions for other developments in St Helier, it is proposed that discharge rates will be reduced by 20% when compared to the existing scenario, also allowing for an increase in rainfall intensity of 10% to account for the predicted impacts of climate change. This reduction has been applied to both the 1 in 1 year and 1 in 100 year plus climate change scenarios, which will be restricted to 199.4 l/s and 642.2 l/s respectively, to achieve the surface water credits under the BREEAM Pol 03 criteria.

This restriction in runoff would be achieved through the provision of significant green roofs and soft landscaping to reduce the impermeable area, together with attenuation storage. It is proposed that this will discharge to the surrounding public surface water sewers, which ultimately discharge to the sea. Four surface water drainage catchments are proposed, with two draining by gravity and two requiring pumping.

Within the main area of built development in the south of the Site, surface water runoff would be attenuated using podium tanks located within the ground floor build up, for which a potential capacity of 3,495m^3 had been provided, as well as through lined permeable paving within landscaped areas. Calculations have demonstrated that the scheme will provide more than the necessary volume of storage required to attenuate surface water flow from the site by 20% (Approx. 970 m^3).

Attenuation storage would be provided within permeable paving in the north of the Site, discharging to the surface water sewer system, although the potential to discharge direct to the sea will be reviewed at the detailed design stage.

Appropriate treatment would be incorporated into the surface water drainage system to ensure that the quality of water discharged is acceptable. This would be achieved through the incorporation of SuDS including green roofs, permeable paving and rain gardens.

The proposed on-site SuDS would be privately managed and maintained for the lifetime of the Development, ensuring that they remain fit for purpose and function appropriately. The management company/operator would be appointed post-planning.

The proposed development is estimated to generate foul flows of 18.7 l/s, an increase of 17.6 l/s, which would be pumped from below the basement to the local public foul sewer systems.

The proposed basement structure will require the diversion of an existing public foul sewer and a proposed route has been agreed in principle with Government of Jersey, with further details and

formal agreements to follow post planning.

It is also proposed to build over a large diameter public surface water sewer. A new section of surface sewer will be constructed alongside the existing. This is to ensure diversions from the existing sewer can be made in the future should operational issues arise. The new section of pipe will stem from a new manhole to be constructed outside of the basement wall upstream and connect downstream into the existing manhole MHS3. This is a requirement of GoJ and would allow an agreement to build over the sewer at this location. Pile walls to construct the basement box will be terminated 2m from the existing surface sewer to provide an easement and a capping beam will be installed across the sewer.

1. Introduction

1.1. Waterman Infrastructure and Environment have been commissioned by The Jersey Development Company Ltd (the 'Applicant') to prepare a Drainage Strategy for Planning for the proposed development of land off the Esplanade and A1 La Route de la Liberation, St. Helier (hereafter referred to as the 'Site')

Site Description

1.2. The Site is located in the south-west of St. Helier (west of the historic centre) on the southern coast of Jersey. It covers an area of approximately 11.5 hectares (ha), split by La Route de la Liberation from south-east to north-west. The Site comprises reclaimed and infilled land and is currently occupied by a mixture of uses including car parks (surface and basement), a leisure complex, the Waterfront Promenade, the seaside park of Les Jardins de la Mer as well as a number of cafes and a ferry kiosk. The location of the Site is shown in Figure 1 below.

Figure 1: Site Location Plan

1.3. Existing Site levels are provided within the Topographic Survey for the Site (Appendix A), which covers the main development area but not the most northerly areas of the Site.

Proposed Development

1.4. This report has been prepared to accompany an outline planning application (with all matters reserved), comprising the demolition of existing structures and the phased construction of new development comprising up to 984 residential dwellings, retail and commercial uses, leisure, arts and cultural facilities, social infrastructure, public and private open spaces, basement car parking, new pedestrian and vehicular access and other associated landscape and infrastructure works including relocated slipway, works to the sea wall and reclamation of land to rear of realigned sea wall. Refer to Appendix B for the Development Proposals.

Scope of Report

1.5. This report outlines the proposed drainage strategy for the Site setting out how surface water runoff from the Site would be managed sustainably to ensure that flood risk is not increased elsewhere. It also considers the proposed foul flows from the Site.

1.6. Although this report does not include a BREEAM Pol 03 drainage assessment, reference is made to BREEAM standards where required as this guidance has been used where appropriate.

2. Planning Policy and Guidance

Building Bye-Laws (Jersey) 2007 (as-amended)

2.1. Section 6.3 Rainwater Drainage requires that development sites make ‘adequate provision’ for rainwater to be carried from the roof of a building.

2.2. The following order of priority applies in respect to the method of discharge;

- An adequate soakaway or some other adequate infiltration system; or, where that is not reasonably practicable;
- A watercourse; or, where that is not reasonably practicable;
- A sewer.

Bridging Island Plan 2022[i]

2.3. Volume 3 Minimising Waste and Environmental Risk, reinforced by policy WER6 (Surface Water Drainage) requires that development sites:

- implement Sustainable Drainage Systems (SuDS);
- use minimal areas of impermeable surfaces;
- adopt the Drainage Hierarchy; and
- limit surface water runoff to pre-existing rates.

2.4. Any proposed development located within a flood risk area must highlight this risk has been identified and present appropriate mitigation measures such as SuDS. The Bridging Island Plan indicates planning decisions within flood risk areas are determined using the 'flood risk categories’ and ‘development vulnerability classifications’ detailed within the Plan.

3. Existing Drainage

Existing Assets

3.1. Existing asset plans for the Site and surrounding areas have been provided the Government of Jersey and are provided in Appendix C.

3.2. For the purposes of the Drainage Strategy, the following assets in Table 1 are of particular importance:

Table 1: Existing Sewers

Sewer	Location	Closest Manhole Reference
300mm/225mm Surface Water Sewer	Adjacent to the Esplanade in the north	MH3
380mm Surface Water Sewer	Adjacent to the Esplanade in the north	LS09S700
600mm Surface Water Sewer	Beneath Rue de L'etau in the west	MHS1 to MHS2
1,370mm x 914mm Surface Water Sewer	Beneath Esplanade in the east	Manholes not labelled
750mm Surface Water Sewer	Adjacent to La Rte du Port Elizabeth	MHS9
300mm Foul Sewer	Beneath Rue de L'etau in the west	MHF2
300mm Foul Sewer	Crossing the Site from Rue de L'etau win the west to the Esplanade in the north	n/a (several)
1143mm Foul Sewer	Beneath Esplanade in the east	MH15

Existing Surface Water Runoff

Existing Catchments

3.3. The total Site boundary covers an area of 11.487ha, however there are areas on Site such as existing highways where the drainage regime will not be amended as part of the proposals and these areas have been excluded from the assessment. These areas, along with the existing permeable and impermeable areas are shown in Appendix D and summarised below in Table 2.

Table 2: Existing Site Condition

	Area (ha)
Impermeable	6.881
Permeable	1.607
Area Excluded	2.999
Total	11.487

Existing Discharge Rates

3.4. The existing discharge rates for the 1 in 1 year, 1 in 30 year and 1 in 100 year events have been calculated using FSR data and the Modified Rational Method. Table 3 below summarises the existing total discharge rates from the Site, based on the total impermeable area of 6.881 ha.

Table 3: Existing Discharge Rates

	1 in 1 year	1 in 30 year	1 in 100 year
Existing Discharge Rate (l/s)	249.2	613.0	802.8

4. Proposed Surface Water Drainage

Surface Water Discharge Mechanism

4.1. The proposed drainage system would be designed to convey foul and surface water separately. All drainage works will be designed in accordance with States of Jersey (SoJ) Technical Guidance Document Part 6, 2014 and in consultation with SoJ Drainage. The design would be in accordance with BS EN 752 – Drain and Sewer Systems Outside Buildings[ii], BS EN 12056 – Gravity Drainage Systems Inside Buildings[iii].

4.2. In line with the Building Bye-Laws (Jersey) 2007, and accompanying Technical Guidance, the following hierarchy of surface water disposal should be adhered to, in decreasing order of preference:

I. Adequate soakaway or some other adequate infiltration system;

II. A watercourse;

III. A sewer;

Discharge via Soakaway or Other Infiltration System

4.3. Based on information provided within the Waterman Preliminary Geo-Environmental Risk Assessment (September 2021)[iv], the Site is underlain by approximately 8-12m of Made Ground with Beach deposits (consisting of medium dense clayey sand or firm sandy clayey silt). These geological strata are not considered permeable and it is uncertain whether there is contamination present. Groundwater levels have been recorded to vary between 1.7m to 3.4m AOD and are tidally influenced.

4.4. The proposed basement extends across the majority of the Site area and based on required offsets between infiltration systems and structures / highways, infiltration across the majority of the Site is not considered to be feasible.

4.5. In summary it is not considered feasible to utilise infiltration as a means of draining surface water runoff from the Development.

Discharge to a Watercourse

4.6. Although the Site is in close proximity to the sea, for much of the southern areas of the Site, there would be a requirement for outfalls to cross third party land. There are however areas of the Site in the north that are directly adjacent to the sea and the potential for direct outfalls will therefore be reviewed at the detailed design stage. This would reduce the impact of the Development on the existing sewer system and result in a reduction in the volume of attenuation storage required.

Discharge to a Sewer

4.7. As noted above, there are a number of existing public surface water sewers in the vicinity of the Site that ultimately discharge to the sea. At this stage, a precautionary approach has been undertaken in relation to the attenuation requirements and it is proposed that all runoff from the Site will discharge to the surrounding sewers. The potential to discharge runoff direct to the sea will be reviewed post-planning.

Sustainable Drainage Systems

4.8. The most sustainable way to drain surface water is through the use of SuDS, which need to be considered in relation to site-specific constraints. SuDS mimic the natural drainage system and provide a method of surface water drainage which can decrease the quantity of surface water discharged, and hence reduce the risk of flooding. In addition to reducing flood risk, SuDS features can improve water quality and provide amenity and biodiversity benefits.

4.9. A variety of SuDS are available to reduce or temporarily attenuate the discharge of surface water runoff from the Site. The potential for SuDS has been considered throughout the development of the scheme proposals. Table 4 below outlines the potential SuDS features and their constraints and opportunities at the Site.

Table 4: SuDS Constraints and Opportunities

Device	Description	Constraints/Comments	✓/×
Green/brown/blue roofs (source control)	Provide soft landscaping at roof level which reduces surface water runoff. Blue roofs can be located below green roofs and provide temporary attenuation of surface water runoff within cellular storage layers designed to store water at roof level	Green roofs are proposed widely across the development. Podium tanks comprising shallow cellular storage are additionally proposed within the build-up above the ground floor slab.	✓
Infiltration devices & Soakaways (source control)	Store runoff and allow water to percolate into the ground via natural infiltration	The underlying geology and proposed basements preclude the potential for infiltration devices across the Site.	x
Pervious surfaces (source control)	Storm water is allowed to infiltrate through the surface into a storage layer, from which it can infiltrate and/or slowly discharge into sewers	Permeable paving is proposed widely across the north of the Site and also on accessible roofs and podiums to treat runoff and provide attenuation storage.	✓
Rainwater harvesting (source control)	Reduces the annual average rate of runoff from the site by reusing water for non-potable uses e.g. toilet flushing or water butts.	There are no constraints to the incorporation of rainwater harvesting at the Site. Opportunities to include smart systems that combine harvesting and attenuation) will be investigated post planning.	✓
Swales (permeable conveyance)	Broad, shallow channels that convey/store runoff, and allow infiltration (ground conditions permitting)	Swales are proposed to be incorporated into the proposed development.	✓

Filter drains & perforated pipes (permeable conveyance)	Trenches filled with granular materials (which are designed to take flows from adjacent impermeable areas) that convey runoff while allowing infiltration (ground conditions permitting)	Filter drains could be provided in the northern part of the Site, although these would likely be lined due to ground conditions, so providing treatment of runoff rather than reducing the discharge from the Site.	✓
Filter strips (permeable conveyance)	Wide, gently sloping areas of grass or dense vegetation that remove pollutants from runoff from adjacent areas	Filter strips are not proposed at the Site.	x
Infiltration basins (end of pipe treatment)	Depressions in the surface designed to store runoff and allow infiltration through the base	Due to the underlying geology, infiltration basins are not considered feasible.	x
Bio-retention systems/ rain garden (end of pipe treatment)	A shallow landscaped depression which allows runoff to pond temporarily on the surface before filtering through vegetation and underlying soils	Rain gardens would be provided in the northern part of the Site.	✓
Dry ponds (end of pipe treatment) / Detention Basins	Depressions in the surface designed to store runoff without infiltration through the base	Detention basins are not proposed at the Site.	x
Underground attenuation (end of pipe treatment)	Oversized pipes or geo-cellular tanks designed to store water below ground level	Attenuation storage would be provided within podium tanks and permeable paving at ground level.	✓

Proposed Catchments

4.11. Measurements of the proposed impermeable and permeable areas have been undertaken and are summarised in Table 5 below and Appendices D and E. The public highway will be managed separately and has therefore been excluded from these measurements. However, swales and rain gardens implemented along La Route de la Liberation and along the cycle ways will provide a betterment over the existing situation.

4.12. It can be seen when comparing Tables 2 and 5 that the Development would reduce the overall impermeable area due to the doubling of the area of soft landscaping proposed.

Table 5: Proposed Impermeable and Permeable Areas

	Area (ha)
Impermeable	5.098
Permeable*	4.171
Area Excluded	2.298
Total	11.567

** Note that permeable areas include ground level planted areas and areas of green roofs*

Proposed Discharge Rates

4.13. It is proposed that the total discharge from the Site will be reduced by 20% when compared to the existing scenario, in line with BREEAM requirements, for both the 1 in 1 year and 1 in 100 year plus climate change scenarios. Furthermore, as requested by the Government of Jersey, consideration has also been made for the 1 in 30 year scenario. In line with previous submissions for other developments in St Helier a climate change allowance of 10% has been used.

4.14. Table 6 below summarises the existing and proposed discharge rates from the Site and illustrates that a 20% reduction is to be provided, refer to Appendix E for further detail.

Table 6: Proposed Discharge Rates

	1 in 1 year	1 in 30 year	1 in 100 year + 10% CC
Existing Discharge Rate (l/s)	249.2	613.0	802.8
Proposed Discharge Rate (l/s)	199.4	490.4	642.2
Percentage Reduction	20%	20%	20%

Surface Water Management Proposals

4.15. In order to limit the discharge of surface water runoff without the ability to reduce the runoff volume through infiltration to the ground, it is proposed that attenuation storage would be provided through permeable paving in the landscaped areas and in the form of geo-cellular tanks within the build-up between the ground floor structural slab and the landscape finished floor levels.

4.16. Given the size of the Site, it is likely that multiple outfalls will be required to the public sewer. Based on a review of the outfalls available, runoff will be discharged to the public sewer via a combination of pumping and gravity outfalls, as shown in Table 7 below. In consideration of this, the Site has been sub-divided into four drainage catchments to determine the likely volume of attenuation required across the site. The extent of each catchment is shown in Appendix D.

Table 7: Method of Discharge

	Method of Discharge	Discharge Location
Catchment 1	Gravity	MH3 adjacent to the Esplanade in the north (or LS09S700, subject to confirmation of levels)
Catchment 2	Pumped	To 600mm diameter surface water sewer beneath Rue de L'etau
Catchment 3	Pumped	To 1,370mm x 914mm surface water sewer beneath Esplanade in the east
Catchment 4	Gravity	MHS9 adjacent to La Rte du Port Elizabeth

4.17. As noted previously, the potential to discharge some catchments (particularly Catchment 1) to the sea will be explored in greater depth at the detailed design stage.

4.18. The design team is aware of several flapped outfalls which currently discharge through the existing sea wall (5-6m AOD). Although not shown on the typical concept design sections provided to date, these outfalls will be extended or rerouted as required and will discharge in a similar manner through the new coastal defences (with flaps).

4.19. There is sufficient elevation above the beach to ensure this can occur without risk of blockage from beach sediment etc. The design details will be worked up and will be included on the detailed design drawings at the subsequent stage. Discussions with IHE / asset maintainers will be held as required to facilitate this process and ensure acceptable arrangements and designs are achieved.

4.20. The impermeable areas for each of the four catchments have been measured at both ground level and roof level and are shown in Appendix D and summarised in Table 8 below.

Table 8: Proposed Impermeable Areas

	Total Area (ha)	Total Permeable Area* (ha)	Total Impermeable Area (ha)	Accessible Green Roof Area (ha)	Factored Impermeable Area** (ha)
Catchment 1	2.547	0.785	1.762	0.000	1.762
Catchment 2	3.814	1.987	1.827	0.781	2.139
Catchment 3	1.347	0.513	0.834	0.151	0.894
Catchment 4	1.561	0.885	0.676	0.165	0.742
		Total			5.537

* *Total permeable area includes all permeable surfaces (external permeable landscape and green roof) without consideration of their permeability*

** *Factored impermeable area has been calculated based on the total impermeable area of the site (external hard landscape and roofs), including an additional 40% runoff allowance from accessible green roofs*

4.21. It is anticipated that the attenuation tanks for Catchments 2, 3, and 4 will be provided within the ground floor build up, as set out above. The attenuation storage for Catchment 1 would be provided through permeable paving, either within the permeable sub-base or within geo-cellular crates below the filter layer.

4.22. Table 9 below summarises the proposed discharge rates from each catchment for the 1 in 1 year, 1 in 30 year and 1 in 100 year plus 10% climate change scenarios.

Table 9: Proposed Discharge Rates

	1 in 1 year	1 in 30 year	1 in 100 year + 10% CC
Catchment 1	58.1	142.9	187.2
Catchment 2	83.9	206.3	270.2
Catchment 3	31.8	78.2	102.5
Catchment 4	25.6	62.9	82.3
Total	199.4	490.4	642.2

4.23. The following assumptions and approaches have undertaken in modelling the proposed drainage system:

- MicroDrainage 2020.1.3, source control module has been utilised.
- FSR Data has been used in line with previous submissions for other developments in St Helier.
- As with previous submissions in the area, the drainage network has been designed to accommodate the 1 in 100 year plus 10% climate change scenario with no subsequent flooding.
- Where gravity outfalls are possible, complex flow controls utilising hydrobrakes and an orifice plate have been provided to ensure that discharges comply with the 1 in 1 year, 1 in 30 year and 1 in 100 year restricted rates.
- Where pumped outfalls are required, a pumped outfall with appropriate depth to flow relationship has been specified again to ensure that discharges comply with the 1 in 1 year, 1 in 30 year and 1 in 100 year restricted rates.

4.24. Table 10 below summarises the expected minimum attenuation volumes that will need to be provided within each catchment to achieve the necessary reduction in runoff rates, as set out in Table 6.

Table 10: Minimum Required Attenuation

	Modelled Attenuation Volumes (m^3)
Catchment 1	360
Catchment 2	320
Catchment 3	140
Catchment 4	150
Total	970

4.25. Based on the proposals provided by the landscape architect, it has been determined that geo-cellular attenuation could be provided over an area of 24,524m^2 of the Site as illustrated in Figure 2 below.

4.26. As a result of variations in proposed landscaping levels, structural slab levels and soil depths, the potential attenuation storage depths vary from between 50mm – 850mm across the Site. To be precautionary however, an assumed maximum depth of 150mm has been accounted for across the Site in the storage calculations. The landscape architect has confirmed that there is sufficient flexibility in the current framework design to increase the storage depths where required at the detailed design stage.

Figure 2: Ground Floor Geo-cellular Attenuation Area

4.27. Assuming the provision of geo-cellular tanks with a depth of 150mm and a porosity (void ratio) of 0.95, it has been calculated that an attenuation volume of 3,495m³ could be provided within the ground floor build up across the Site, as summarised in Table 11. As such it is evident that the scheme can accommodate a significantly larger volume of attenuation than required to achieve a 20% reduction in runoff rates from the site.

Table 11: Potential Attenuation Volume

Potential Attenuation Plan Area	Depth (m)	Porosity	Attenuation Volume (m³)
24,524	0.15	0.95	3,495

4.28. The routing of flows to these tanks would be confirmed post planning when further details of the proposals are available. It is anticipated that multiple restricted outlets would be required from the geo-cellular attenuation within the ground floor build up. The locations of these outlets as well as the routing of surface water drainage pipework at high level within the basement and connections to the surrounding public sewer network would be confirmed at the detailed design stage.

Management of residual wave overtopping

4.29. The new coastal defences will provide a significant reduction in wave overtopping flood risk to the Site. Under storm events some residual overtopping is expected on the promenade area between the primary and secondary defences and the required drainage to remove this water back to sea will be developed at the detailed design stage. This is likely to involve channel drain to collect water and flapped outfalls to return the water.

4.30. Under the most extreme events it is assessed that some modest overtopping of the secondary defences could still occur under certain conditions. The existing standard drainage system behind the wall will be utilised to collect this water and returned to the sea (much in the same way as surface water). This will be further assessed, checked and confirmed at the detailed design stage and should any additional drainage be required this will be detailed. Currently the residual risk mapping shows very shallow flood risk at the site from overtopping in the design event, but currently the modelling has conservatively assumed no drainage.

Water Quality

4.31. The quality of surface water runoff from the Site has been considered in line with the SuDS Manual Simple Index Approach. Table 12 below is based on Table 26.2 of the SuDS Manual and considers the pollution indices based on land use.

Table 12: Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential Roofs	Very Low	0.2	0.2	0.05
Other Roofs	Low	0.3	0.2	0.05
Ground Level Hard Landscaped Areas and Low Traffic Roads	Low	0.5	0.4	0.4

4.32. Table 13 below indicates that the mitigation indices provided by the proposed SuDS features would provide suitable mitigation to ensure surface water runoff would be of a suitable water quality.

Table 13: SuDS Mitigation Indices

	Mitigation Indices		
SuDS Component	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Green Roofs	0.8	0.7	0.9
Rain Gardens and Swales	0.8	0.8	0.8
Permeable Paving	0.7	0.6	0.7

Exceedance Routing

4.33. Should a rainfall event occur that exceeds the 1 in 100 year plus 10% climate change scenario or should there be a blockage or failure of the surface water drainage system, overland flow routes would be routed towards the La Route de la Liberation and the Esplanade in the east. In all scenarios, the exceedance flow routes will be away from the built development.

4.34. Pumping stations located beneath the basement slab would be provided with back up pumps. An overflow system could be provided to reduce the risk of a failure in this system, which could otherwise result in flooding could occurring within the basement. The uses in the basement are

generally limited to parking and back of house and the impact of any flooding is therefore considered to be minimal.

Sustainable Drainage Systems Management Plan

4.35. Post construction, the on-site management company (who would be appointed post-planning) would be responsible for the SuDS included in the scheme.

4.36. A detailed site-wide landscape maintenance and management plan will be developed post-planning. Table 14 below provides a high-level summary of the maintenance that is anticipated for the proposed SuDS features.

4.37. SuDS outside the scheme boundary, such as the swales along La Route de la Liberation would be managed by IHE. SuDS along Rue de L'Etau are expected to be within the remit of Parish of St Helier's management.

Table 14: Sustainable Drainage Typical Maintenance Arrangements

SuDS	
Task	**Frequency**
Green/Brown Roofs	
• Inspect system to replace dead plants as required and ensure plants are sufficiently watered (during establishment period)	As required
• Inspect system to replace dead plants (post establishment period)	Annually (in autumn)
• Remove nuisance and invasive vegetation, including weeds	Six monthly or as required
• Inspect system to ensure substrate is not eroded and inlet/outlet drains are not blocked	Annually or as required (after severe storms)
Pervious Surfacing	
• Stabilise and mow contributing adjacent areas and remove any weeds • Remedial work to any depressions, rutting and cracked or broken surfacing considered detrimental to the structural performance or a hazard to users	As required
• Initial sweeping	Monthly for 3 months after installation
• Brushing and vacuuming	Annually or as required
• Inspect silt accumulation rates and establish appropriate brushing frequencies and monitor inspection chambers	Annually
• Rehabilitation of surface and upper substructure removed by remedial sweeping	Every 10-15 years or as required

SuDS	
Task	**Frequency**
Rainwater Harvesting	
• Inspect system for debris/blockages	Annually or as required
Rain Gardens and Swales	
• Replace any plants to maintain density • Infill any holes or scour in the filter medium, improve erosion protection if required • Repair minor accumulation of silt by raking away surface mulch, scarifying surface of medium and replacing mulch	As required
• Inspect infiltration surfaces, inlets and outlets • Assess plants for disease, poor growth and replace as necessary	Three monthly
• Remove sediment, litter, weeds and debris	Three monthly or as required
• Check operation of underdrains	Annually
Geo-cellular Tanks	
• Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
• Remove debris from catchment surface, where it may cause risks to performance	Monthly
• Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
• Repair/rehabilitate inlets, outlet, and overflows and vents	As required
• Survey inside of tank for sediment build-up and remove if necessary	Every 5 years of as required

5. Impact on Existing Drainage Infrastructure

Foul Sewer Diversion

5.1. In order to facilitate the construction of the proposed basement it would be necessary to divert the 300mm diameter public foul sewer which crosses the Site from the Rue de L'etau to the southwest of the site to the Esplanade in the north.

5.2. The existing 300mm diameter foul sewer has an estimated capacity of 70 l/s, based on an existing minimum gradient of 1:195. The concept diversion (Appendix F) proposed as part of this outline application route is longer in length and so the gradient and capacity would be reduced from that existing.

5.3. It is proposed to connect to existing public foul sewer MH14 in the Esplanade, which is 1.143m in diameter and has cover and invert level of 7.458m and 2.307m AOD respectively. It is proposed that a new connection would be made 150mm above the soffit level of the receiving sewer, i.e. at 3.60m AOD.

5.4. This would result in a fall of 1.56m along a pipe length of 362m from the proposed diversion location close to MHF2 and a resulting gradient of 1:234, as shown in Appendix F. To prevent a loss of capacity, it is currently proposed to increase the diameter of the pipe from 300mm to 450mm, to give a capacity of 187.5 l/s. The concept was previously discussed and agreed in principle with Government of Jersey on 10th November 2020.

5.5. The existing base flow from upstream of the Site has been estimated to be 9.2 l/s (Appendix F) based on a desk based assessment of the land uses upstream of the Site, as shown on the mark up in Appendix F. The current onsite uses, which comprise a cinema, sports centre, bars and restaurants are estimated to generate an existing flow of 1.1 l/s, which would be removed from the system as part of the development.

5.6. When combined with the proposed flows of 18.7 l/s from the development, which includes additional office and residential accommodation (assuming conservatively that all new flows connect to the diverted sewer) the estimated proposed flow in the diverted sewer would be 27.9 l/s, an increase of 17.6 l/s over that existing (accounting for the 1.1 l/s to be removed). Initial calculations are presented in Appendix F which show that this concept design would allow for an increase in velocity compared to the existing situation, from 0.50 l/s to 0.62 l/s (at one third design flow) to assist with self-cleansing.

5.7. As per Sewers for Adoption[1], 0.75 m/s is the recommended minimum velocity at one third design flow to facilitate self-cleansing. As discussed with IHE at a meeting on 5th October 2022, there is the potential to increase the gradient of the proposed foul sewer diversion by dropping the downstream invert to achieve a soffit-to-soffit connection. Surcharging occurs when pumps downstream are down for maintenance every three months and it is recommended that the pipe connection should be as high as possible. Increasing the peaking value from 2.12 to 6 increases the velocity at one third design flow to 0.75 m/s, achieving the self-cleansing velocity, see Appendix H.

5.8. The proposed diversion would generally maintain a 5m offset from the proposed basement, however there is a pinch point between the proposed basement and the Radisson Blu Hotel. The total width between the building and basement extent at this location is 4.79m and the pipe is currently proposed to sit half-way between the two structures, so offset around 2.4m from each of them. The location of the pipework can be adjusted following agreement with Government of

[1] Water UK, 2018. *Sewers for Adoption*. Eight Edition. [online] Available at: SfA-8-Master-2.pdf (water.org.uk)

Jersey.

5.9. The principle of the foul sewer diversion has agreed, noting that a Drainage Impact Assessment (DIA) will be undertaken post planning submission to facilitate further development of design.

Surface Water Sewer Build Over

5.10. The proposed basement structure would sit over the existing deep 1350mm surface water sewer flowing west from the Esplanade towards the outfall into the sea. between manhole MHS2 in the east and manhole MHS3 in the west. Ground level land uses are restricted to landscaping and a swimming pool and changing rooms.

5.11. The basement would comprise a slab of approximately 400mm depth, so based on the proposed structural slab level of 3.420m AOD, the underside of the basement slab would be 3.020m AOD.

5.12. The pile layout is yet to be determined, however there will be sufficient flexibility in the design to allow appropriate horizontal clearance from the outside edge of the pipe to any structural elements. Piles would be taken down well below the invert of the pipe to ensure that no loadings from the building are placed on it. The basement construction sequencing will take account of the effects of removing the overburden over the sewer.

5.13. Manhole MHS2 upstream of the proposed basement structure has an invert level of 0.008m AOD based on the Government of Jersey sewer records in Appendix C, with the top of pipe at approximately 1.583m AOD and a depth of cover of 5.622m. Manhole MHS3 adjacent to and downstream of the structure has an invert level of -0.282m AOD, with the top of pipe at approximately 1.293m AOD and a depth of cover of 7.315m.

5.14. The foundations will be designed to ensure the sewer is not subject to additional loadings from the building. The invert level of the sewer where the basement crosses it at the upstream extent would be -0.061 AOD, with a soffit level of 1.289m AOD and the top of the pipe assumed at 1.589m AOD assuming a construction thickness of 300mm. The underside of the basement slab would be set at 3.020m AOD, assuming a slab depth of 400mm. This will ensure a minimum of 1.431m vertical clearance is provided from the underside of the basement slab to the top of the pipe in the east. This clearance would increase to more than 1m further west as the pipe falls away from the flat basement slab above.

5.15. A new section of surface sewer will be constructed alongside to existing sewer. This is to ensure diversions from the existing sewer can be made in the future should operational issues arise. The new section of pipe will stem from a new manhole to be constructed outside of the basement wall upstream and connect downstream into the existing manhole MHS3. This is a requirement of GoJ and would allow an agreement to build over the sewer at this location. Pile walls to construct the basement box will be terminated 2m from the existing surface sewer to provide an easement and a capping beam will be installed across the sewer.

6. Conclusions

6.1. The existing surface water runoff rates from the Site for the 1 in 1 year and 1 in 100 year scenarios have been calculated to be 249.2 l/s and 802.8 l/s respectively.

6.2. In line with previous submissions for other developments in St Helier, it is proposed that discharge rates will be reduced by 20% when compared to the existing scenario, also allowing for an increase in rainfall intensity of 10% to account for the predicted impacts of climate change. This reduction has been applied to both the 1 in 1 year and 1 in 100 year plus climate change scenarios, which will be restricted to 199.4 l/s and 642.2 l/s respectively, to achieve the surface water credits under the BREEAM Pol 03 criteria.

6.3. This restriction in runoff would be achieved through the provision of significant green roofs and soft landscaping to reduce the impermeable area, together with attenuation storage. It is proposed that this will discharge to the surrounding public surface water sewers, which ultimately discharge to the sea. Four surface water drainage catchments are proposed, with two draining by gravity and two requiring pumping.

6.4. Within the main area of built development in the south of the Site, surface water runoff would be attenuated using podium tanks located within the ground floor build up, for which a potential capacity of 3,495m^3 had been provided, as well as through lined permeable paving within landscaped areas. Calculations have demonstrated that the scheme will provide more than the necessary volume of storage required to attenuate surface water flow from the site by 20% (approx. 970m^3).

6.5. Attenuation storage would be provided within permeable paving in the north of the Site, discharging to the surface water sewer system, although the potential to discharge direct to the sea will be reviewed at the detailed design stage.

6.6. Appropriate treatment would be incorporated into the surface water drainage system to ensure that the quality of water discharged is acceptable. This would be achieved through the incorporation of SuDS including green roofs, permeable paving and rain gardens.

6.7. The proposed on-site SuDS would be privately managed and maintained for the lifetime of the Development, ensuring that they remain fit for purpose and function appropriately. The management company/operator would be appointed post-planning.

6.8. The proposed development is estimated to generate foul flows of 18.7 l/s, an increase of 17.6 l/s, which would be pumped from below the basement to the local public foul sewer systems.

6.9. The proposed basement structure will require the diversion of an existing public foul sewer and a proposed route has been agreed in principle with Government of Jersey, with further details and formal agreements to follow post planning.

6.10. It is also proposed to build over a large diameter public surface water sewer. A new section of surface sewer will be constructed alongside the existing. This is to ensure diversions from the existing sewer can be made in the future should operational issues arise. The new section of pipe will stem from a new manhole to be constructed outside of the basement wall upstream and connect downstream into the existing manhole MHS3. This is a requirement of GoJ and would allow an agreement to build over the sewer at this location. Pile walls to construct the basement box will be terminated 2m from the existing surface sewer to provide an easement and a capping beam will be installed across the sewer.

APPENDICES

A. Topographic Survey

ABBREVIATIONS

1FL	1st Floor Level	Mtr	Meter
ACU	Air Conditioning Unit	MS	Mile Post/stone
B/C	Building Canopy	MB	Mooring Bollard
BB	Belisha Beacon	NFI	No Further Information
BO	Bollard	NA	No Access
BMk	Boundary Marker	NM	Node Marker
Bk	Brick	OHC	Overhead Cable
BW	Brick Wall	OSA	Off Survey Area
BS	Bus Stop	PM	Parking Meter
CR	Cable Riser	PBM	Permanent Bench Mark
CTV	Cable TV	Pl	Pillar
C/P	Catch Pit	PR	Pipe Riser
C/L	Chain Link Fence	P	Post
Col	Column	P/R	Post and Rail Fence
C/B	Close Boarded Fence	P/W	Post and Wire Fence
Co	Concrete	PS	Paving Stone
CWS	Combined Water Sewer	RWP	Rain Water Pipe
C/I	Corrugated Iron Fence	RL	Ridge Level
CL	Cover Level	R/W	Retaining Wall
CBlk/W	Concrete Block Wall	RS	Road Sign
Dil	Dilapidated	RE	Rodding Eye
dis	Disused	RT	Roof Top
DK	Drop Kerb	S/A	Soakaway
ER	Earth Rod	SL	Soffit Level
EB	Electricity Box	Spr	Spring
EC	Electricity Cover	ST	Stop Tap
EL	Eaves Level	SS	Structure Support
EP	Electricity Pole	SP	Sign Post
FL	Floor Level	Stn	Survey Station
FT	Fence Top Level	UGC	Under Ground Chamber
GFL	Ground Floor Level	TFR	Taken From Records
GS	Gas Valve	TP	Telegraph Pole
G/W	Granite Wall	TCB	Telephone Call Box
G	Gully	TBM	Temporary Bench Mark
IC	Inspection Cover	TOW	Top Of Wall
IL	Invert Level	TS	Traffic Signals
I/R	Iron Rail Fence	TH	Trail Hole / Pit
KO	Kerb Outlet	UTR	Unable to Raise
LP	Lamp Post	UTS	Unable to Survey
LB	Letter Box	VL	Vegetation Level
LC	Lighting Column	VP	Vent Pipe
MH	Manhole Cover	VTP	Vertical Vent Pipe
MKr	Marker	W	Water Cover
JTB	Jersey Telecom Box	WL	Water Level
JT	Jersey Telecom Cover	WM	Water Meter

NOTES

Eaves levels have been observed to the change of pitch/ edge of bottom roof tile.

REV.	DETAILS	BY	DATE

GRID: JERSEY MERCATOR GRID
DATUM: OS DATUM

precision surveys
La Forge
La Rue des Buttes
St Mary, JE3 3DS
Tel: 07829 888 585
guido@precisionsurveys.biz
Certificate Number 110314

CLIENT:
STATES OF JERSEY DEVELOPMENT COMPANY LTD
DIALOGUE HOUSE
6 ANLEY STREET
ST HELIER

PROJECT TITLE:
THE WATERFRONT
PROPOSED REDEVELOPMENT

DRAWING TITLE:
TOPOGRAPHICAL SURVEY

SURVEYED BY: GR	DRAWN BY: GR	SHEET SIZE: A1
SCALE: 1:200	SURVEY DATE: NOV20	
DRAWING NUMBER: PS1143-101	SHEET NUMBER:	REV:

B. Development Proposals

Notes

1.0 Do not scale from drawing, use figured dimensions only
1.1 All dimensions to be checked onsite
1.2 This drawing to be read in conjunction with all other Gillespies drawings and specifications

Legend

- Paving Type 1
- Paving Type 2
- Paving Type 3
- Paving Type 4
- Paving Type 5
- Paving Type 6
- Court Surfacing
- Cycle Lane
- Stairs
- Ramp
- Wall
- Void to Bunker
- Existing Grade 2 Listed Wall
- Planting Type 1
- Planting Type 2 - Lawn
- Planting Type 3 - Shrub
- Sand
- Tree
- Bench Type 1 (Timber Bench)
- Bench Type 2
- Bench type 3
- Bench Type 4
- Cycle Stand
- Water Jets
- Tree Pit
- Lighting Catenary
- Artwork
- Boulders
- Rock Climbing Boudlers
- Slide
- Timber Climbing Frame
- Trampoline
- Basketball Hoop
- Table Tennis

N

0 25 50 100

rev	details	by	date
00	For Information	YL	13.08.2021
01	For Information	YL	25.08.2021
02	For Information	SC	29.09.2021
03	For Information	MF	30.09.2021
04	For Information	MP	20.10.2021
05	For Information	MP	26.10.2021
06	For Information	YL	28.10.2021
07	For Information	YL	10.11.2021
08	For Planning	SC	19.11.2021
09	For Planning	YL	02.12.2021

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WSP

CIVILS & INFRASTRUCTURE, ENVIRONMENTAL, EIA AND SUSTAINABILITY
Waterman Group

TRANSPORT & TRAFFIC
WSP

MARINE AND COASTAL DEFENSE
AECOM

Project title
SWSH Visioning Framework

Drawing title
Landscape Masterplan

Drawing number
P12157-00-003-GIL-0100

Drawing Status
PLANNING

Revision
09

Date	Scale	Drawn	Checked
13.08.21	1:1250 @ A1	YL	MF

Client
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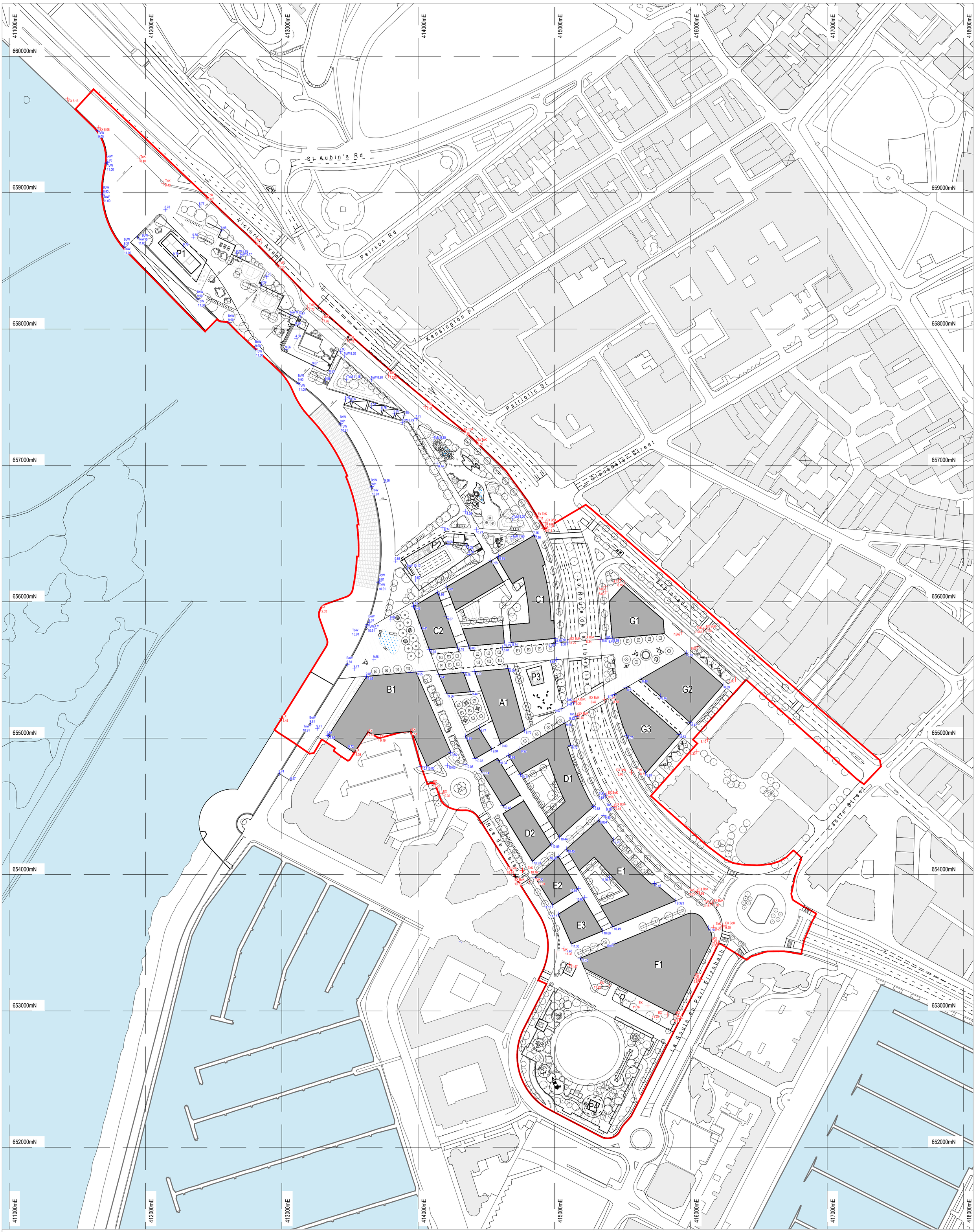

Notes

1.0 Do not scale from drawing, use figured dimensions only
1.1 All dimensions to be checked onsite
1.2 This drawing to be read in conjunction with all other Gillespies drawings and specifications

Legend

- Existing Surface Level (00.00)
- Proposed Surface Level (00.00)
- Falls (1:XX)
- Contours

N

0 25 50 100

rev	details	by	date
00	For Information	MF	13.08.2021
01	For Information	MF	17.08.2021
02	For Information	SC	29.08.2021
03	For Planning	SC	19.11.2021
04	For Planning	YL	02.12.2021

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Waterman Group

TRANSPORT & TRAFFIC
WSP

MARINE AND COASTAL DEFENSE
AECOM

Project title
SWSH Visioning Framework

Drawing title
Site Levels and Grading

Drawing number
P12157-00-003-GIL-0101

Drawing Status
PLANNING

Revision
04

Date	Scale	Drawn	Checked
13.08.21	1:1250 @ A1	MF	MP

Client
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r:\p12157-00-003 vf jersey channel islands planning\Drawings\01 design\CAD\100 Series\P12157-00-003-GIL-0101 Site Levels and Grading.dwg

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+FFL 2.39 +FFL 2.45 +FFL 2.50 +FFL 3.98 +FFL 3.162 +FFL 4.15 +FFL 4.87 +FFL 4.623 +FFL 4.80 +FFL 5.90

PL RBS RBP RP PL+S S PMP PCH EM WCS CP PP EPP RMP

Notes

1.0 Do not scale from drawing, use figured dimensions only
1.1 All dimensions to be checked onsite
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Legend

- Planning Boundary
- PP Public Parking
- RP Residential Parking
- PMP Public Motorbike Parking
- RMP Residential Motorbike Parking
- RBP Residential Bicycle Parking
- S Storage
- PL Plant Room
- PCH Public Cycle Hub
- RBS Residential Bin Store
- WCS Waste Collection Station
- EM Estate Management - Post and Parcel
- CP Commercial Parking
- EPP Existing Public Parking

N

0 25 50 100

rev	details	by	date
00	For Information	YZ	20.08.2021
01	For Information	MF	25.08.2021
02	For Information	YL	03.09.2021
03	For Information	SC	29.09.2021
04	For Information	MP	10.11.2021
05	For Planning	MF	19.11.2021
06	For Planning	YL	02.12.2021

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MARINE AND COASTAL DEFENSE
AECOM

Project title
SWSH Visioning Framework

Drawing title
Proposed Masterplan – Basement B2

Drawing number
P12157-00-003-GIL-0103

Drawing Status
PLANNING

Revision
06

Date	Scale	Drawn	Checked
20.08.21	1:1250 @ A1	YZ	MF

Client
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Notes

1.0 Do not scale from drawing, use figured dimensions only
1.1 All dimensions to be checked onsite
1.2 This drawing to be read in conjunction with all other Gillespies drawings and specifications

Legend

- Planning Boundary
- A1 Plot Number
- Accessible Roof
- Biodiverse Roof
- Roof Plant (MEP)

N

0 25 50 100

rev	details	by	date
00	For Information	SC	20.08.2021
01	For Information	SC	25.08.2021
02	For Information	SC	03.09.2021
03	For Information	SC	29.09.2021
04	For Information	SC	19.11.2021
05	For Planning	YL	02.12.2021

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Waterman Group

TRANSPORT & TRAFFIC
WSP

MARINE AND COASTAL DEFENSE
AECOM

Project title
SWSH Visioning Framework

Drawing title
Proposed Masterplan - Roof

Drawing number
P12157-00-003-GIL-0116

Drawing Status
PLANNING

Revision
05

Date	Scale	Drawn	Checked
20.08.21	1:1250 @ A1	SC	MF

Client
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C. Existing Drainage Assets

DWG NO.

Government of JERSEY

INFRASTRUCTURE, HOUSING AND ENVIRONMENT

DRAINAGE INFRASTRUCTURE

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BELLOZANNE ROAD
ST HELIER
JERSEY
JE4 8UY

TEL: 01534 445509

DWG TITLE
SOUTH WEST ST HELIER DEV
RUE DE L'ETAU

ST HELIER

DRAWN BY	DATE
IHE RECORDS	06/10/2022
SCALE	SHEET SIZE
nts	A3
DWG NO.	

SHEET NO.	REVISION
1 of 1	RECORD

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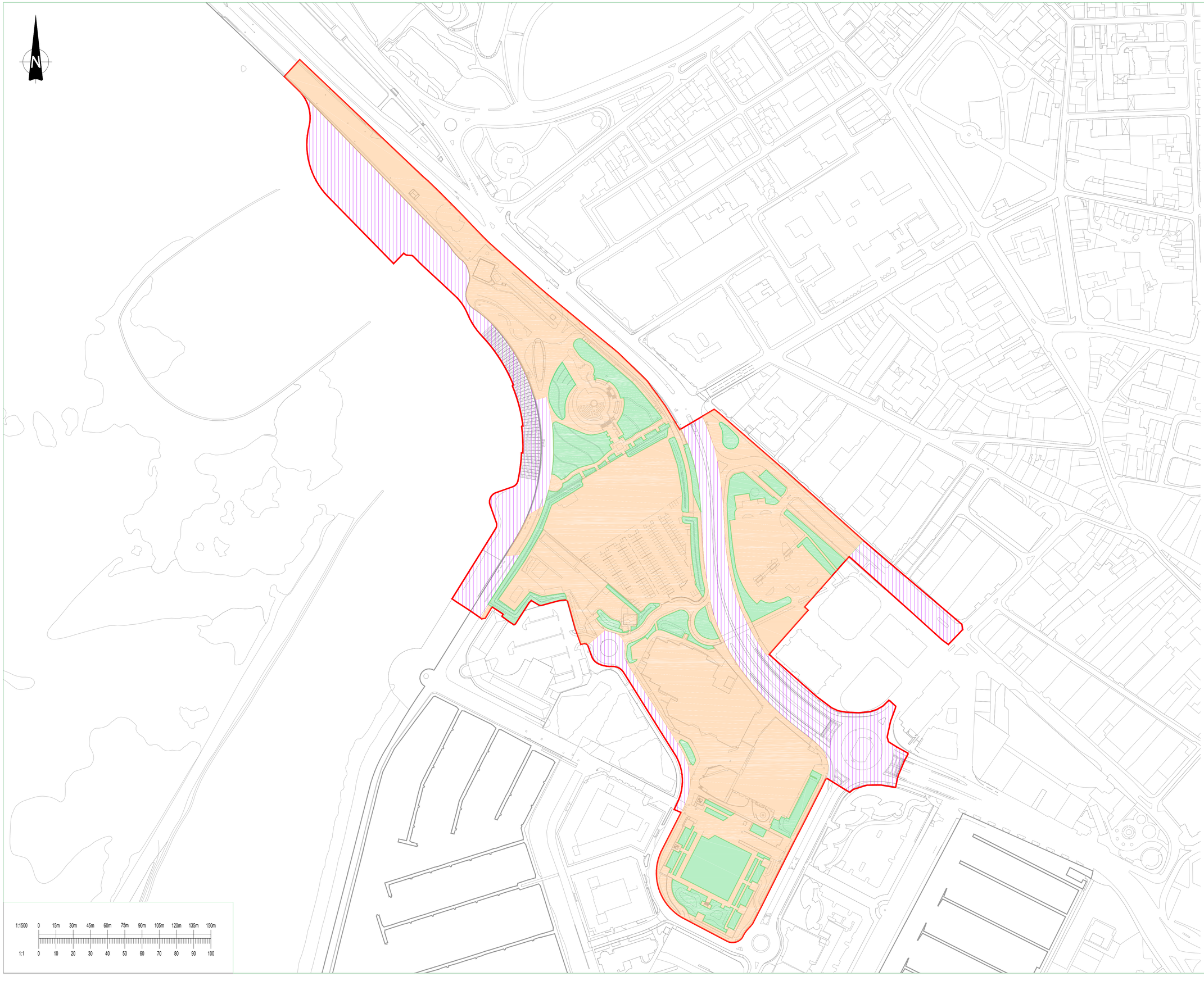
D. Drainage Strategy Plans



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1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEER'S, ARCHITECT'S OR OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
2. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO PREPARING ANY WORKING DRAWINGS OR COMMENCING ON SITE.
3. THE CONTRACTOR MUST ENSURE AND WILL BE HELD RESPONSIBLE FOR THE OVERALL STABILITY OF THE BUILDING/STRUCTURE/EXCAVATION AT ALL STAGES OF THE WORK.
4. ALL WORK BY THE CONTRACTOR MUST BE CARRIED OUT IN SUCH A WAY THAT ALL REQUIREMENTS UNDER THE HEALTH AND SAFETY AT WORK ACT ARE SATISFIED.
5. ALL WORK IS TO BE CARRIED OUT IN COMPLIANCE WITH THE REQUIREMENTS OF THE RELEVANT STATUTORY AUTHORITIES AND REGULATIONS.

KEY

- SITE BOUNDARY (AREA = 11.487 ha)
- IMPERMEABLE CATCHMENT (AREA = 6.881 ha)
- PERMEABLE CATCHMENT (AREA = 1.607 ha)
- AREA EXCLUDED FROM CALCULATIONS (AREA = 2.999 ha)

Status	Date	Description	By	Chk
P01 S2	14.10.21	ISSUED	CT	BM

Amendments

Project
JERSEY WATERFRONT,
SOUTH WEST ST. HELIER

Title
EXISTING SURFACE WATER DRAINAGE CATCHMENTS

Client
JERSEY DEVELOPMENT COMPANY

Pickfords Wharf Clink Street London SE1 9DG
t 020 7928 7888
mail@watermangroup.com www.watermangroup.com

Status
PRELIMINARY

Designed By	Director	Waterman Ref
CT	BM	Projects
Drawn By	Date	Scales @ A1
CT	OCTOBER 2021	1:1,500

Project - Originator - Volume - Level - Type - Role - Number
17128-WIE-ZZ-ZZ-XX-DR-92002

Revision
P01

File Path
\\ie4\WIE\Projects\WIE17128\100 - EIA\7_CAD\92_Drainage\Drainage Strategy Drawings\

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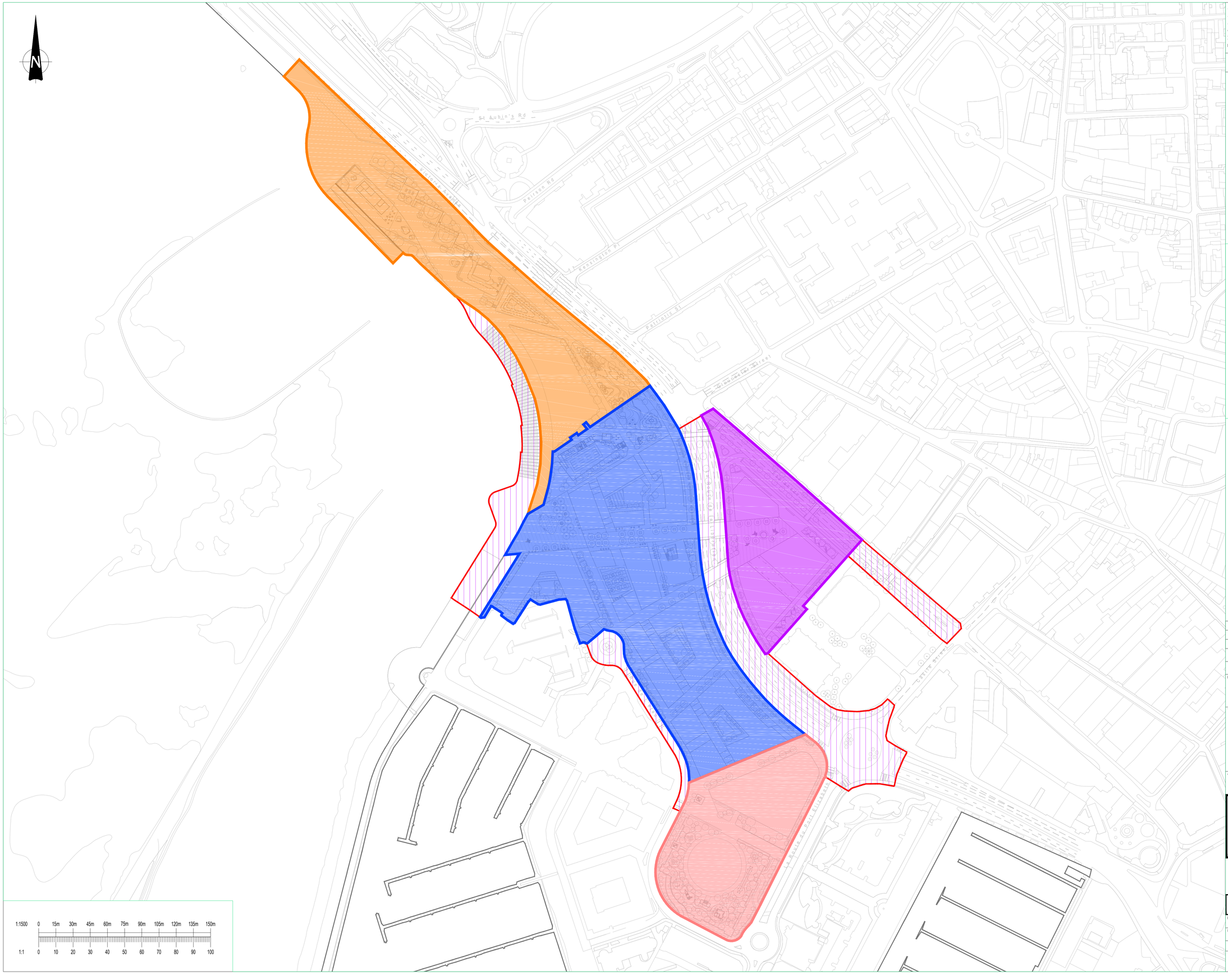

Pickfords Wharf, Clink Street, London SE1 9DG t 020 7928 7888 f 03333 444 501

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2. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO PREPARING ANY WORKING DRAWINGS OR COMMENCING ON SITE.
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5. ALL WORK IS TO BE CARRIED OUT IN COMPLIANCE WITH THE REQUIREMENTS OF THE RELEVANT STATUTORY AUTHORITIES AND REGULATIONS.

KEY

- SITE BOUNDARY (AREA = 11.487 ha)
- CATCHMENT 1 (AREA = 2.451 ha)
- CATCHMENT 2 (AREA = 3.823 ha)
- CATCHMENT 3 (AREA = 1.350 ha)
- CATCHMENT 1 (AREA = 1.565 ha)
- AREA EXCLUDED FROM CALCULATIONS (AREA = 2.298 ha)

1:1500 0 15m 30m 45m 60m 75m 90m 105m 120m 135m 150m

1:1 0 10 20 30 40 50 60 70 80 90 100

P02	S2	08.11.21	BACKGROUND UPDATED	DO	BM
P01	S2	14.10.21	ISSUED	CT	BM
Status		Date	Description	By	Chk

Amendments

Project
JERSEY WATERFRONT,
SOUTH WEST ST. HELIER

Title
PROPOSED TOTAL SURFACE WATER DRAINAGE CATCHMENTS

Client
JERSEY DEVELOPMENT COMPANY

Pickfords Wharf Clink Street London SE1 9DG
t 020 7928 7888
mail@watermangroup.com www.watermangroup.com

Status
PRELIMINARY

Designed By	CT	Director	BM
Drawn By	CT	Date	OCTOBER 2021
Waterman Ref	Projects	Scales @ A1	1:1,500

Project - Originator - Volume - Level - Type - Role - Number: 17128-WIE-ZZ-ZZ-XX-DR-92003
Revision: P02

File Path: \\Hshwiel\Projects\WIE\17128\100 - EA7_CAD\92_Drainage\Drainage Strategy Drawings\

A1-Wat-BS-S, P12157-00-003-GIL-0100-03 Landscape Masterplan_WIE

IMPERMEABLE AREA SUMMARY

	TOTAL AREA (HA)	TOTAL PERMEABLE AREA (HA)	TOTAL IMPERMEABLE AREA (HA)
CATCHMENT 1	2.547	0.785	1.762
CATCHMENT 2	3.814	1.987	1.827
CATCHMENT 3	1.347	0.513	0.833
CATCHMENT 4	1.561	0.885	0.677
		TOTAL	5.098

DISCHARGE RATE SUMMARY

	1 IN 1 YR DISCHARGE RATE (l/s)	1 IN 30 YR DISCHARGE RATE (l/s)	1 IN 100 YR DISCHARGE RATE (l/s)
CATCHMENT 1	58.1	142.9	187.2
CATCHMENT 2	83.9	206.3	270.2
CATCHMENT 3	31.8	78.2	102.5
CATCHMENT 4	25.6	62.9	82.3
TOTAL	199.4	490.4	642.2

Pickfords Wharf, Clink Street, London SE1 9DG t 020 7928 7888 f 03333 444 501

GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEER'S, ARCHITECT'S OR OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
2. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO PREPARING ANY WORKING DRAWINGS OR COMMENCING ON SITE.
3. THE CONTRACTOR MUST ENSURE AND WILL BE HELD RESPONSIBLE FOR THE OVERALL STABILITY OF THE BUILDING/STRUCTURE/EXCAVATION AT ALL STAGES OF THE WORK.
4. ALL WORK BY THE CONTRACTOR MUST BE CARRIED OUT IN SUCH A WAY THAT ALL REQUIREMENTS UNDER THE HEALTH AND SAFETY AT WORK ACT ARE SATISFIED.
5. ALL WORK IS TO BE CARRIED OUT IN COMPLIANCE WITH THE REQUIREMENTS OF THE RELEVANT STATUTORY AUTHORITIES AND REGULATIONS.

KEY

- GROUND LEVEL IMPERMEABLE AREAS (INCLUDES AREAS OF POSITIVELY DRAINED PERMEABLE PAVING)
- GROUND LEVEL PERMEABLE AREAS (CONSIDERED 100% PERMEABLE)
- BIODIVERSE GREEN ROOF (CONSIDERED 100% PERMEABLE)
- ACCESSIBLE GREEN ROOF (40% IMPERMEABLE AND 60% PERMEABLE)

P03	S2	07.12.22	UPDATED BASED ON LATEST MASTERPLAN	SW	BM
P02	S2	08.11.21	UPDATED BACKGROUND	DO	BM
P01	S2	14.10.21	ISSUED	CT	BM
Status		Date	Description	By	Chk

Amendments

Project: JERSEY WATERFRONT, SOUTH WEST ST. HELIER

Title: PROPOSED IMPERMEABLE AND PERMEABLE CATCHMENTS

Client: JERSEY DEVELOPMENT COMPANY

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Status: PRELIMINARY

Designed By	CT	Director	BM
Drawn By	CT	Date	OCTOBER 2021
Waterman Ref			Projects
Scales @ A1			1:1,500

Project - Originator - Volume - Level - Type - Role - Number: 17128-WIE-ZZ-ZZ-XX-DR-92004

Revision: P03

File Path: \\h-BWIE\Projects\WIE17128\100 - EIA\7_CAD\02_Drainage\Drainage Strategy Drawings\

A1-Wat-BS-S, x-permeable areas, x-roofplan

E. Surface Water Drainage Calculations

Summary of Results for 1 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	7.458	0.218	36.8	78.4	O K
30 min Summer	7.497	0.257	46.6	92.4	O K
60 min Summer	7.520	0.280	51.8	100.7	O K
120 min Summer	7.521	0.281	52.1	101.3	O K
180 min Summer	7.509	0.269	49.5	96.9	O K
240 min Summer	7.495	0.255	46.3	92.0	O K
360 min Summer	7.471	0.231	40.2	83.2	O K
480 min Summer	7.453	0.213	35.5	76.5	O K
600 min Summer	7.438	0.198	31.7	71.4	O K
720 min Summer	7.427	0.187	28.9	67.4	O K
960 min Summer	7.410	0.170	24.6	61.3	O K
1440 min Summer	7.388	0.148	19.4	53.4	O K
2160 min Summer	7.369	0.129	15.0	46.3	O K
2880 min Summer	7.356	0.116	12.5	41.9	O K
4320 min Summer	7.341	0.101	9.6	36.2	O K
5760 min Summer	7.331	0.091	7.9	32.6	O K
7200 min Summer	7.324	0.084	6.8	30.1	O K
8640 min Summer	7.318	0.078	6.0	28.1	O K
10080 min Summer	7.314	0.074	5.3	26.6	O K
15 min Winter	7.480	0.240	42.6	86.5	O K
30 min Winter	7.522	0.282	52.3	101.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	29.615	0.0	96.4	21
30 min Summer	19.610	0.0	128.1	29
60 min Summer	12.656	0.0	166.5	46
120 min Summer	8.018	0.0	211.2	78
180 min Summer	6.113	0.0	241.6	108
240 min Summer	5.039	0.0	265.6	140
360 min Summer	3.801	0.0	300.6	200
480 min Summer	3.109	0.0	327.9	260
600 min Summer	2.660	0.0	350.7	322
720 min Summer	2.343	0.0	370.6	382
960 min Summer	1.917	0.0	404.3	502
1440 min Summer	1.446	0.0	457.2	744
2160 min Summer	1.089	0.0	517.5	1108
2880 min Summer	0.891	0.0	564.3	1472
4320 min Summer	0.672	0.0	637.7	2204
5760 min Summer	0.550	0.0	697.5	2936
7200 min Summer	0.471	0.0	747.1	3672
8640 min Summer	0.414	0.0	787.7	4400
10080 min Summer	0.371	0.0	823.1	5136
15 min Winter	29.615	0.0	108.1	21
30 min Winter	19.610	0.0	143.7	30