Appendix A: Local Flood Risk Strategies
Figure 13: Plymouth flood risk catchments
Identifying strategies for each catchment in Plymouth

8.2.6. For each catchment described in Section 5, issues, objectives and strategies have been developed in order to manage flood risk.

8.2.7. Following a workshop with the flood risk management authorities, the draft Strategies and Objectives for each catchment were amended. The final draft strategies are shown in BOLD in the following tables, with the catchments listed in alphabetical order.

8.2.8. The methodology used to identify the scale of flood risk and prioritise the catchments is described in Section 6.3.

Standard of Protection and design criteria

The Standard of Protection (SoP) adopted for new and remedial works in Plymouth is 0.5% AEP (2110) against tidal flooding and 1% AEP against fluvial flooding. For surface water flooding the standard of protection is a 1% AEP event with a 1 hour storm duration.

<table>
<thead>
<tr>
<th>Catchment</th>
<th>Key Issues</th>
<th>Objectives</th>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crownhill</td>
<td>The catchment is heavily urbanised with potential areas of development. Controls over drainage and sewerage networks can reduce risk of pollution and surface water flooding.</td>
<td>Incorporate Strategic SuDS schemes into future developments. Reduce pollution and flood risk in watercourses and improve environmental conditions in Forder Valley Stream. Look to achieve ‘Betterment’ on previously developed sites by restricting runoff to Greenfield Rates. This would reduce peak runoff within the catchment and gradually provide benefits by reintroducing capacity in the network for Climate Change and Urban Creep.</td>
<td>Reduce pollution in watercourses and reduce future surface water flood risk linked to development.</td>
</tr>
</tbody>
</table>

| Dockyard | The key flood risk is from surface water flooding. There is also some future tidal flood risk at the Torpoint ferry and adjacent MoD land. | Reduce risk of surface water flooding along the St. Levan Road corridor. Address tidal flood risk | Increase capacity for surface water runoff. Aim to provide 0.5% AEP (2110) standard of protection against tidal flooding. |
### Hamoaze

**Key Issues**
Main area of flood risk is around Weston Mill and Wolseley Road due to capacity of existing combined sewerage systems and watercourses. The dockyard is subject to future tidal flood risk.

**Objectives**
- Reduce risk of surface water flooding by improving the condition of the sewerage/drainage network draining into watercourses
- Improve watercourse channel capacity and condition to improve biological diversity

**Strategy**
Improve capacity and condition of watercourses to facilitate separation of surface water from combined sewerage systems. Aim to provide 0.5% AEP (2110) standard of protection against tidal flooding.

### Marsh Mills

**Key Issues**
- Tidal and fluvial flood risk from the River Plym (Main River).
- Tidally influenced surface water flooding around Lipson & Laira.
- Frequent sewage related pollution incidents at Arnold’s Point.
- Flooding from multiple sources so Multi-Agency approach - Multiple Drivers and Multiple Benefits

**Objectives**
- Provide future flood protection to property against tidal and fluvial flooding from the River Plym.
- Remove pollution discharge into the River Plym.
- Reduce risk of surface water flooding in Lipson and Laira.
- Detailed investigation to understand the mechanism of hydraulics and pollution

**Strategy**
Manage interactions between sewerage, surface water and tidal influences. Aim to provide 0.5% AEP (2110) standard of protection against tidal flooding.

### Millbay and City

**Key Issues**
- Surface water flood risk around Union St and the Octagon, very low ground levels ~ 2m AOD.
- Some tidal flood risk around Millbay development areas. Possibilities to raise ground levels.
- Future tidal flood risk is an issue.
- Reduced capacity within surface water and combined sewerage systems.

**Objectives**
- Reduce extent and frequency of surface water flooding.
- Increase sewerage capacity.
- Development opportunities for using storage and SuDS. Identify key developments to address flood risk holistically

**Strategy**
Improve capacity within combined sewerage and highway drainage systems. Manage interactions between sewerage and surface water systems and tidal influences. Minimise risk from future predicted tidal flooding.
### Plym Valley

**Key Issues**
- SWW localised operational sewerage system issues around Glenholt and Glenholt pumping station.
- Fluvial, surface water and tidal flooding in the south of the catchment.
- SWW Investigate Urban Diffuse Pollution Incidents (Misconnections) and growth in run-off to foul sewer.

**Objectives**
- Improve standard of protection for property from surface water, fluvial and tidal flooding.

**Strategy**
- **Aim to provide 0.5% AEP (2110) standard of protection from tidal flooding and 1% AEP standard of protection from surface water and fluvial flooding.**
- Improve watercourse quality.

### Plympton Longbrook

**Key Issues**
- Catchment is at risk of flooding from Long Brook, tidal flooding and surface water runoff.
- Main issue is surface water unable to get into Long Brook, rather than Long Brook overtopping. Increase capacity of watercourse with reference to WFD objectives.
- Also runoff from agricultural land causes algal growth, and pollution of watercourses.
- Rapid Response to rainfall
- Contains Plympton IUD sub catchments ‘Upper Longbrook Urban Watershed Management’ and ‘Linketty Lane Fluvial Exceedence Corridor’.

**Objectives**
- Improve capacity of watercourse.
- Reduce sewerage pollution
- Reduce tidal influence on existing sewerage and drainage system
- Improve surface water connection to Long Brook

**Strategy**
- **Separate surface water from combined sewerage systems and increase ordinary watercourse and Main River capacity, with reference to WFD objectives.**

### Plympton Tory Brook

**Key Issues**
- Flood risk from Tory Brook, Stoggy Lane Stream, Chaddlewood Stream and Boringdon Stream, all Main River, and related ordinary watercourses.
- Surface water runoff and inadequate combined sewerage capacity. Lots of misconnections in this catchment
- Quick response of catchment limits Flood Warning options. This area is in the Rapid Response Register. EA have RRC Action Plan.
- Tory Brook is subject to a WFD restoration scheme and has some insufficient capacity.
- SWW Rank 1 High Priority Risk

**Objectives**
- Separate out surface water from combined sewerage.
- Improve capacity of Tory Brook and ordinary watercourses.
- Meet WFD objectives

**Strategy**
- **Separate surface water from combined sewerage systems and increase ordinary watercourse and Main River capacity, with reference to WFD objectives.**
<table>
<thead>
<tr>
<th>Project Name: Plymouth City Council: Local Flood Risk Management Strategy. Protecting People, Places and Property</th>
</tr>
</thead>
<tbody>
<tr>
<td>Document Title: Local Flood Risk Management Strategy Part 2 - Technical Guidance</td>
</tr>
</tbody>
</table>

### Plympton Woodford

**Key Issues**
Issue of flood flows discharging from Tory Brook into adjacent Longbrook catchment. There is a surface water flow route through the catchment, and pollution incidents from CSO spills. Tory Brook is subject to a WFD restoration scheme.

**Objectives**
- Improve capacity of Tory Brook.
- Attenuate surface water flows.
- Meet WFD objectives

**Strategy**
Separate surface water from combined sewerage systems and increase ordinary watercourse and Main River capacity, with reference to WFD objectives.

### Pophlett Lake

**Key Issues**
- Tidal flood risk at Oreston, Hoee and Turnchapel. Mountbatten offers some protection from wave action.
- High number of SWW incidents including CSO spills, blockages and pollution incidents.
- Pollution here impacts on Bathing Water Quality.
- Groundwater flooding around Haye Road and surface water flooding around Broadway and Plymstock.
- Existing sewerage system under Oreston Quay affected by saline infiltration.

**Objectives**
- Reduce tidal flood risk and investigate role of Mountbatten breakwater.
- Reduce potential for pollution incidents and CSO spills.
- Increase sewerage capacity.
- Reduce surface water flooding around Broadway, Pophlett and Plymstock.
- Meet Bathing Water Quality standards at East and West Hoe beaches.

**Strategy**
Increase capacity of highway drainage and combined sewerage systems through surface water separation and or capacity improvements. Aim to provide 0.5% AEP (2110) standard of defence against tidal flooding.

### Royal William Yard

**Key Issues**
Properties are at risk from tidal flooding with future flooding likely to increase in frequency. There is also some surface water flood risk.

**Objectives**
- Reduce risk of tidal flooding.
- Ensure future development attenuates surface water runoff.

**Strategy**
Aim to provide 0.5% AEP (2110) standard of defence against tidal flooding.
### Saltram

**Key Issues**
- Risk of tidal flooding. One main access route to future development sites will be along The Ride. Also impact to landfill site from tidal flooding.
- Currently a rural catchment with natural surface water flow routes.
- Pollution from this catchment impacts on environmental habitat and bathing water quality.

**Objectives**
- Attenuate surface water.
- Reduce flood risk to The Ride and the landfill site.

**Strategy**
- Manage surface water to reduce risk of flooding. Aim to provide 0.5% AEP (2110) standard of defence against tidal flooding.

### Stonehouse Creek

**Key Issues**
- Tidal flood risk around Richmond Walk.
- Limited capacity in the sewerage system causes CSO spills in Pennycomequick Stream culverted watercourse. There are hydraulic issues along the whole system in this catchment.
- Surface water flooding around Millbridge and flow route through the catchment. This is a suitable area to develop a Surface Water Management Plan.
- Insufficient sewer capacity.

**Objectives**
- Reduce risk of pollution and CSO incidents.
- Improve surface water runoff through the catchment, incorporating SuDS, improved highway and surface water drainage.

**Strategy**
- Increase capacity of highway drainage and combined sewerage systems through surface water separation and or capacity improvements.

### Sutton and Laira

**Key Issues**
- Significant pollution incidents into the River Plym impact on Bathing Water Quality. This catchment has both Designated bathing beaches.
- Risk of tidal flooding to properties in Sutton Harbour and areas along the River Plym.
- Heavily urbanised area with frequent flooding due to surcharged sewerage networks.
- Areas at risk of surface water flooding.

**Objectives**
- Improve bathing water quality to meet new testing criteria at East and West Hoe beaches.
- Reduce tidal influence on surface water drainage.
- Reduce CSO spills and misconnections.
- Reduce impact of siltation on operation of sewers and highway drainage.

**Strategy**
- Increase capacity of highway drainage and combined sewerage systems through surface water separation, capacity improvements and management of saline infiltration. Aim to provide 0.5% AEP (2110) standard of defence against tidal flooding.
<table>
<thead>
<tr>
<th>Tamerton Lake</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key Issues</strong></td>
</tr>
<tr>
<td><strong>Objectives</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Strategy</strong></td>
</tr>
</tbody>
</table>
Appendix B: EA Guidance Note for Critical Drainage Areas
Catchment Drainage / Flooding Issues

Many catchments within the City of Plymouth are small, steep and heavily urbanised making them prone to ‘flash’ flooding during heavy rainfall events. Other critical drainage problems include flooding and water quality problems resulting from the reliance on combined drainage systems (where surface water uses the same pipes as foul water) in many areas of the City and flooding associated with high tides restricting the discharge of surface water from low lying land.

Climate change predictions, which indicate that the frequency and intensity of short, heavy rain storms will increase, will mean these problems are likely to be exacerbated.

These critical drainage problems necessitate additional measures to manage surface water flood risk and the management of water quality, particularly in relation to Plymouth’s designated bathing waters and Water Framework Directive objectives. New surface water drainage connections should not be made to the combined drainage system and we are working together with Plymouth City Council and South West Water to deliver new surface water networks in order to provide appropriate connection points for new developments.

Minimum Drainage Standards Required

All new developments will have to play their part in reducing current rainfall runoff rates. This requirement also applies to brownfield sites that will have to match the same standards. The surface water drainage hierarchy should be followed by using infiltration as far as is practicable. Further guidance on such systems can be found in the CIRIA SuDS Manual and in Lead Local Flood Authority guidance.

All off-site surface water discharges from developments should mimic greenfield performance up to a maximum 1 in 10 year discharge rate. On site all surface water should be safely managed up to the 1 in 100 plus climate change conditions. This will require additional water storage areas to be created thereby contributing to a reduction in flooding downstream.
Appendix C: Areas of Significant Local Flood Risk
Figure 14: Areas at increased risk from surface water flooding
Appendix D: Glossary of Terms
An explanation of commonly used expressions used in this report is provided below.

**AEP (Annual Event Probability).** This is expressed as a percentage and represents the probability of an event occurring in any given year. For example, a 2% AEP flood event has a 2%, or one in 50 chance of occurring in one year. This method is a more accurate representation of flood risk and supersedes the representation as a yearly return period, such as ‘1 in 100 year event’. A conversion table is shown below.

<table>
<thead>
<tr>
<th>Annual Event Probability (AEP)</th>
<th>Equivalent Return period</th>
<th>Risk</th>
<th>Flood Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>1 in 1 year (annually)</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>50%</td>
<td>1 in 2 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20%</td>
<td>1 in 5 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10%</td>
<td>1 in 10 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4%</td>
<td>1 in 25 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2%</td>
<td>1 in 50 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1%</td>
<td>1 in 100 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.2%</td>
<td>1 in 500 years</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>0.1%</td>
<td>1 in 1000 years</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**AAP** Area Action Plan

**Area Benefitting from Defences (ABD).** This is an area in Flood Zone 3 that is protected by a flood alleviation scheme.

**BWD** Bathing Water Directive

**CAG** Community Action Group

**CSO** Combined Sewerage Overflow

**Defra** Department for Environment, Food and Rural Affairs

**Future flood extent (2110).** This is the extent of a 1% AEP (1 in 100 year return period) flood in the year 2110. Climate change effects are taken into account and the flood extent is derived from a computational model.
**Flood Zone.** This is an area at risk of flooding, determined by the Environment Agency. Flood Zones are classified as 1, 2, 3a, and 3b.

<table>
<thead>
<tr>
<th>Flood Zone</th>
<th>AEP (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3b</td>
<td>Functional floodplain (4% AEP)</td>
</tr>
<tr>
<td>3a</td>
<td>1% AEP (Fluvial flooding)</td>
</tr>
<tr>
<td></td>
<td>0.5% AEP (Tidal flooding)</td>
</tr>
<tr>
<td>2</td>
<td>0.1% AEP</td>
</tr>
<tr>
<td>1</td>
<td>Land outside Flood Zones 2, 3a, and 3b.</td>
</tr>
</tbody>
</table>

**INA** Infrastructure Needs Assessment  
**LLFA** Lead Local Flood Authority  
**FWMA** Flood and Water Management Act (2010)  
**Main River.** A watercourse managed and maintained by the Environment Agency.  
**MTP.** Medium Term Plan.  
**NGR.** National Grid Reference  
**NRD** National Receptor Dataset.  
**Ordinary Watercourse.** A watercourse managed and maintained by a Local Authority.  
**PCC** Plymouth City Council  
**PCC Historic Event.** This is a flood related problem reported to Plymouth City Council.  
**PFRA.** Preliminary Flood Risk Assessment  
**PTH** Plymouth Transport and Highways  
**SDADCA** South Devon & Dorset Coastal Authorities Group  
**SFRA.** Strategic Flood Risk Assessment  
**SMP** Shoreline Management Plan  
**SWW** South West Water  
**SWW flood record.** A flood related problem recorded by South West Water  
**UFMfSW** Updated Flood Map for Surface Water  
**WFD** Water Framework Directive
Appendix E: Data Sources
E.1. The following data was used in the assessment of flood risk in the catchment maps.

Reports and Studies:
- Shoreline Management Plan Review (SMP2) Durlston Head to Rame Head: Halcrow 2011
- Plymouth Flood Appraisal Stage II Stonehouse Feasibility Study: Amey 2012
- Plymouth - Preliminary Flood Risk Assessment (PFRA): Amey 2010
- Plymouth Level 2 Strategic Flood Risk Assessment: JBA 2008
- Strategic Flood Risk Assessment: Pell Frischmann 2006

GIS Data:
- Flood Zone Maps 2 & 3, Environment Agency
- Areas Benefitting from Defences, Environment Agency
- Problem Drainage Areas, Environment Agency
- River & Watercourse network, Environment Agency
- NFCDD (National Flood and Coastal Defence Database), Environment Agency
- Areas Susceptible to Surface Water Flooding (ASiSWF) Less, Environment Agency
- Areas Susceptible to Surface Water Flooding (ASiSWF) Intermediate, Environment Agency
- Areas Susceptible to Surface Water Flooding (ASiSWF) More, Environment Agency
- 3.33% AEP (1 in 30 year return period) surface water flood extent (shallow), Environment Agency
- 3.33% AEP (1 in 30 year return period) surface water flood extent (deep), Environment Agency
- 0.5% AEP (1 in 200 year return period) surface water flood extent (shallow), Environment Agency
- 0.5% AEP (1 in 200 year return period) surface water flood extent (deep), Environment Agency
- Historic Flood Events, Plymouth City Council
- Recorded Flood Events, South West Water
- Watercourse culverts, Amey
- Arc Hydro ‘rolling ball’ modelling, JBA
- Critical Services, Plymouth City Council
- Traffic Sensitive Routes, Plymouth City Council
Appendix F: EA Sutton Harbour Development Guidance
Flooding Issues

Land surrounding Sutton Harbour is at risk of flooding from the sea. At present this risk is managed by flood defences, comprising raised quaysides and a flood gate, which controls water levels in the harbour to ensure it remains below the level of the harbour’s quay walls.

While the presence of these defences is acknowledged much of the land surrounding Sutton Harbour is considered to be within Flood Zone 3; defined as having a high probability of flooding from the sea. This is due to the fact that the presence of these defences cannot be guaranteed in perpetuity and because of the residual risk of the flood gate failing to close during a coastal flooding event.

The flood defences, at present offer an adequate standard of protection to development behind them. Rising sea levels, associated with climate change will make the existing defences less effective in the future, increasing the risk of flooding to development surrounding the harbour. The area at risk of flooding allowing for climate change is illustrated in blue on the map below.

New Development and Flood Risk

New development requires an adequate standard of flood defence over its lifetime. At present the flood defences for Sutton Harbour do not provide this due to the increasing risks of being overtopped as sea levels rise. This guidance note sets out our approach for managing flood risk for new development within the current and future area at risk of flooding at Sutton Harbour.
Planning Approach

Any development around Sutton Harbour will need to satisfy the overarching policy set out in the National Planning Policy Framework (NPPF). Proposals will therefore need to take a sequential approach to new development; ensuring the most vulnerable uses avoid the areas of highest flood risk. Likewise Plymouth City Council (PCC) will need to apply the sequential test, set out in the NPPF, to determine whether alternative sites at a lower risk of flooding exist on which a development proposal could be sited. It has been long agreed that the sequential test need only be applied across the area covered by the Sutton Harbour Area Action Plan due to the identified regeneration and growth needs. This is consistent with advice set out in the Planning Practice Guidance.

If the sequential test is satisfied (for example because there are no alternative sites and/or because the proposal is consistent with wider sustainability objectives) the exception test will need to be applied to any development which includes a 'more vulnerable' use. The exception test requires that:

- it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a Strategic Flood Risk Assessment where one has been prepared; and
- a site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

The NPPF requires both parts of the exception test to be passed for development to be permitted.

In order for proposals around Sutton Harbour to demonstrate that they can satisfy national policy new development within the present and future flood risk area should meet all the following requirements:

- There should be no residential or any other 'more vulnerable' development at the ground floor level and no new development below ground level;
- Ground floor levels should be set no lower than 3.15m AOD (meters Above Ordnance Datum);
- Ground floors should incorporate flood resistance and resilience measures;
- Provide and demonstrate a flood warning and evacuation procedures for occupants;
- Residential or any other 'more vulnerable' development should be set no lower than 5.10m AOD
- Provide a proportionate contribution (depending on the scale of development) towards the future upgrade of the Sutton Harbour flood defences to ensure new development benefits from an appropriate standard of protection over its lifetime whilst also helping to reduce flood risk over time to existing development.

Please Note:

At the time of writing the precise details and costing for the upgrades for the Sutton Harbour coastal defences are not known and the contribution towards these works will be determined through negotiation between Developer, PCC and us. We are working with PCC to develop a detailed understanding of the upgrade works and their cost and these will be provided when available.

* The flood risk area includes an allowance for 100 years of sea level rise based on current climate change guidance. Reference ID 7-026-20140306 of the Planning Practice Guidance states that residential development should be considered for a minimum of 100 years.
Appendix G: Flood Defence Consent Application Process
Consent Application Process

Pre-Application discussion

Is the watercourse Ordinary Watercourse or Main River

Applicant must submit application to the EA

Ordinary Watercourse

Do the works need consent?
Consent required for CHANNEL ONLY or DESIGNATED structure
Request Application Form

YES

Consent not required

NO

Submit Application Form and payment to Plymouth City Council

Note: Payment is NOT required for DESIGNATED STRUCTURES

Information required:
- Applicant contact details (business or individual)
- Location grid reference and watercourse details
- Description of works and anticipated start date
- Method statement
- Site drawings, plans and design details
- Details of environmental/pollution impacts of works and mitigation or prevention measures

Plymouth City Council is required to respond within 2 months of receipt of application or consent given by default.

NO WORKS TO START UNTIL CONSENT IS APPROVED BY PCC
Consent Application Process

Application Assessed by Plymouth City Council

Consent Approved
Works have been assessed and considered to present no flood, pollution or environmental risk.

Receive consent approval document and letter, also start and finish notification cards
Consent may have conditions attached which must be observed

Return start notification card to Plymouth City Council.
Site may be visited to check compliance

Submit 24 hour emergency contact number for contractor/landowner

Return finish notification card to Plymouth City Council.
Site may be visited to check compliance

COMPLETE

Application Assessed by Plymouth City Council

Consent DENIED
Works have been assessed and considered to present some flood, pollution or environmental risk.

Right of Appeal

Address reasons for refusal and re-apply
Appendix H: Additional Flood Risk Mapping

Areas at risk from tidal flooding
Fluvial flood outline 0.1% AEP and Integrated Urban Drainage catchments
Surface water flood outline (1% AEP) and locations of critical culverts
Location of coastal defence assets included in Shoreline Asset Register
Fluvial flood outline 0.1% AEP and locations of critical culverts
Historic flood locations in Plymouth
Local flood risk catchments showing key areas at risk of flooding
Areas identified by the Environment Agency as Critical Drainage Areas
This map is based on data supplied by the Environment Agency and South West Water.

Legend
- EA flood zone 2 (fluvial)

Integrated Urban Drainage
Modeling for Plymouth by SWW

Date: 14/07/14

Project Name:
Plymouth City Council: Local Flood Risk Management Strategy. Protecting People, Places and Property

Document Title:
Local Flood Risk Management Strategy Part 2 - Technical Guidance

Doc ref: PL2120164/01 Rev. Final
Issued: 21/02/2017
Project Name: Plymouth City Council: Local Flood Risk Management Strategy. Protecting People, Places and Property
Document Title: Local Flood Risk Management Strategy Part 2 - Technical Guidance

Doc ref: PL2120164/01 Rev. Final
Issued: 21/02/2017

Service is our passion. People, our strength.
Appendix I Draft Standing Advice for Solar Photovoltaic Arrays
Devon County Council's Flood and Coastal Risk Management Team

Draft Standing Advice for Solar Photovoltaic Arrays

Construction

Exceptional care will need to be taken during the construction of these sites because the ground surface is likely to be cultivated or severely disturbed by plant movement and left with exposed soil. As a result, there is great potential for soil erosion and the concentration of downslope flows in rills or gullies, as well as water quality issues for any downstream receiving watercourse or agricultural land.

Devon County Council’s Flood and Coastal Risk Management Team therefore strongly recommends that no work is undertaken until a wide perimeter cross-contour vegetated swale is constructed around the downstream boundary of the site. It is essential that these swales are constructed to intercept flows and limit the aforementioned impacts to the nearby watercourses and surrounding agricultural land.

Ancillary Buildings

Any ancillary buildings on the site, such as inverter cabins or substations, will likely contribute to the perturbed surface water runoff, and without sufficient control measures, will exacerbate the concentration of downslope flows and soil erosion.

As a means of controlling these impacts, filter strips should surround the concrete bases of the ancillary buildings to capture any runoff from the roofs, which should in turn be conveyed to the wide cross-contour perimeter swale around the downstream boundary of the site.

Access Tracks

The movement of plant across these sites is likely to further disturb the ground surface and contribute significantly to soil erosion and water quality issues downstream/downslope.

Any access tracks across the site should therefore be constructed with permeable materials which can be demonstrated to withstand the significant loadings of the machinery required for the construction of these sites. In order to manage any surface water exceedance from the permeable tracks, further swales should be incorporated to convey the water to the cross-contour perimeter swale at the downstream boundary of the site in order to maintain downstream/downslop e water quality.

Vegetation

Concentrated runoff from the panels is likely to lead to erosion of the ground surface below, contributing significantly to water quality issues downstream/downslope.

Tussock grasses should dominate around and beneath the photovoltaic panels to limit soil erosion caused by runoff from the panels. Allowing the site to naturally colonise is likely to leave the soil surface significantly vulnerable to erosion, particularly during intense precipitation events. It is also imperative that these grasses are maintained regularly when the site is operational as the soil structure and the quality of the downstream watercourse or agricultural land will greatly depend on this.
It is strongly advisable that the reader consults Natural England’s Technical Information Note (TIN101), ‘Solar Parks: Maximising Environmental Benefits’, for further information on the vegetation and soil quality issues associated with these developments. The above document can be accessed through the National Archives at the following address: http://publications.naturalengland.org.uk/publication/32027.

**Ordinary Watercourses**

Ordinary watercourses which run through the site may need to be crossed to enable ground works to take place.

If any temporary or permanent works take place within these watercourses (such as an access culvert or bridge), Land Drainage Consent will need to be obtained from Devon County Council’s Flood and Coastal Risk Management team prior to any works commencing. Details of this procedure can be found at: https://new.devon.gov.uk/floodriskmanagement/land-drainage-consent/.