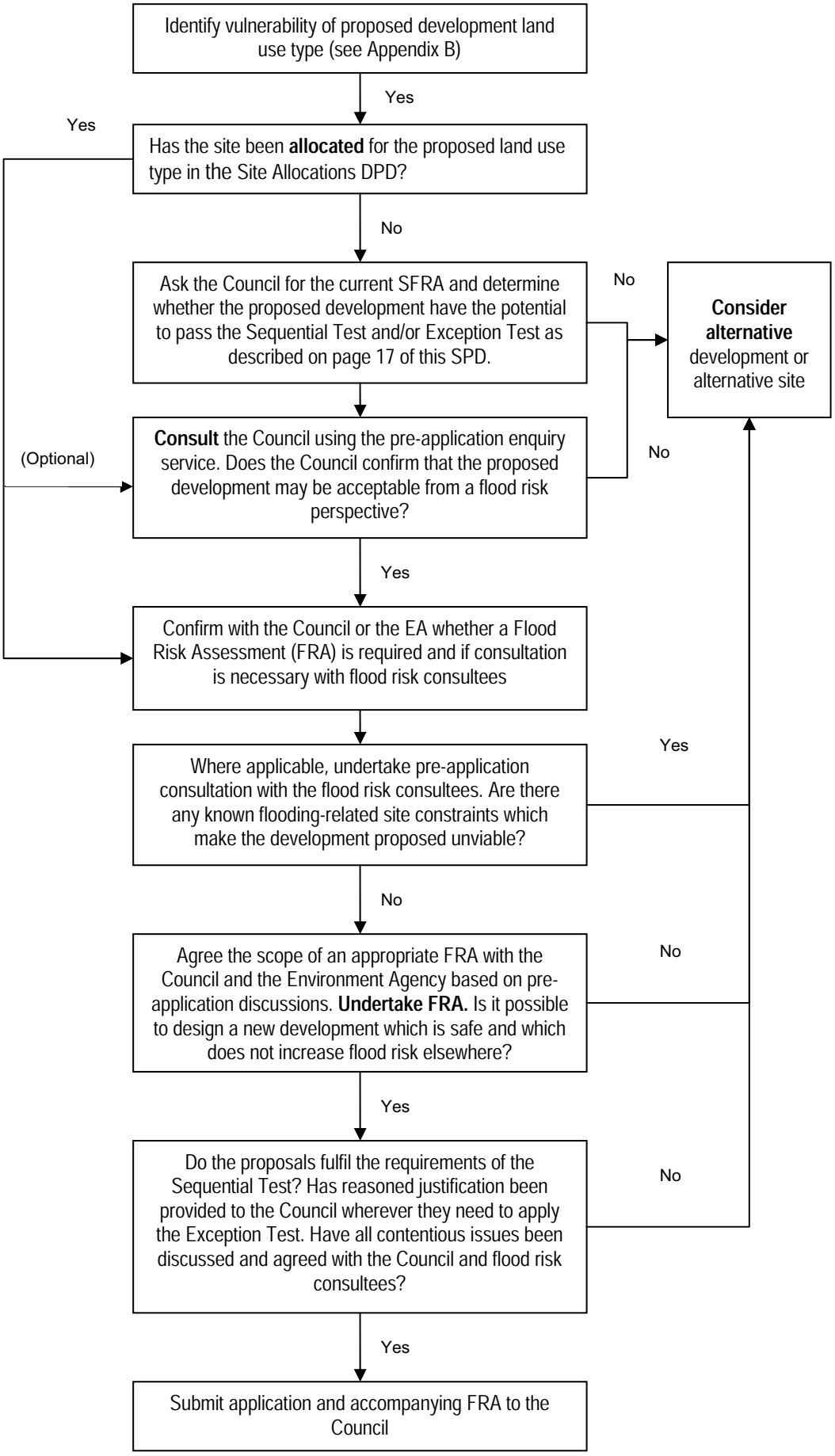
Appendix A - Flood Risk Vulnerability Classification

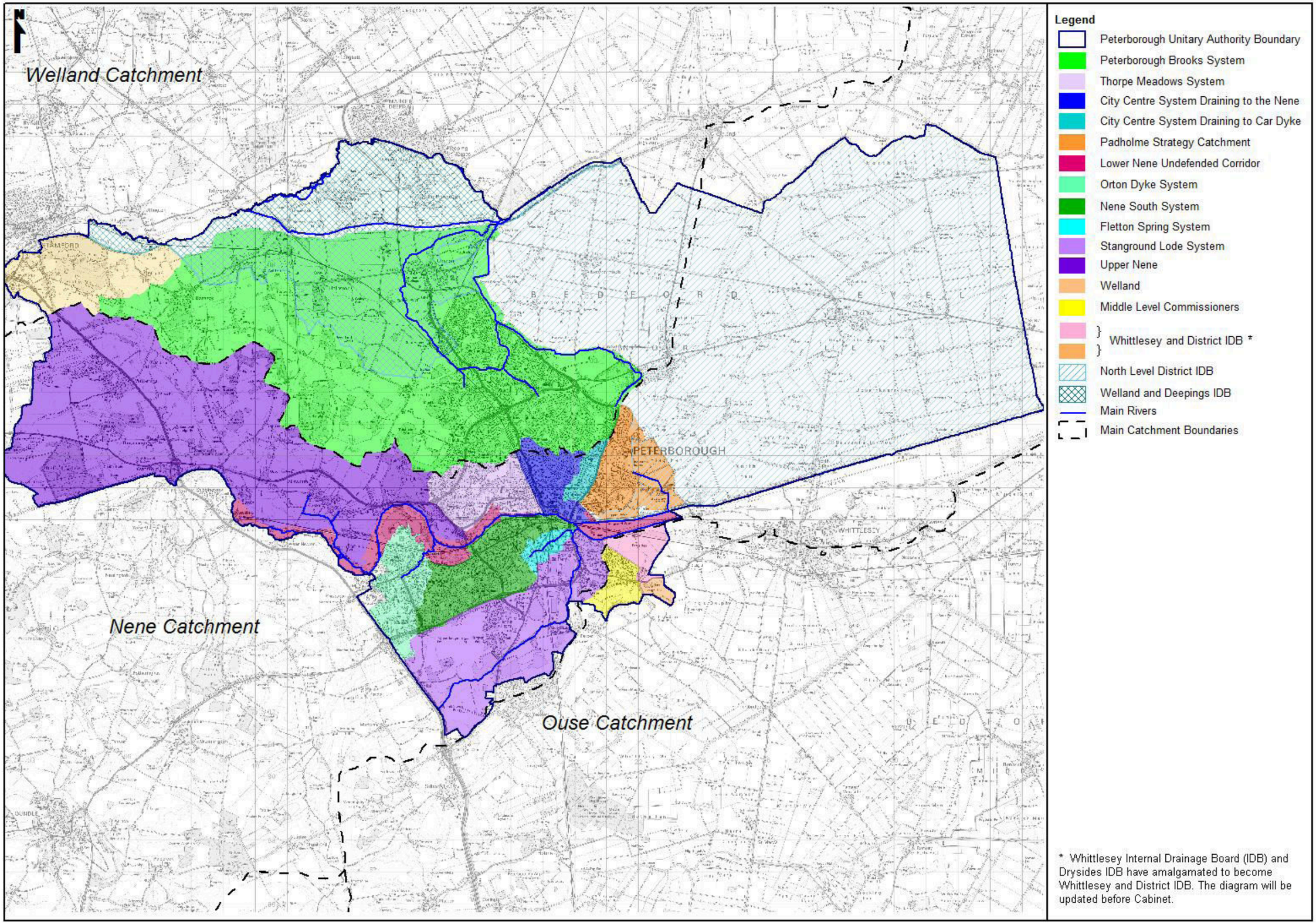
Essential Infrastructure	• Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind turbines.
Highly Vulnerable	• Police stations, Ambulance stations and Fire stations and • Command Centres and telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent.19 (Where • there is a demonstrable need to locate such installations for bulk • storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure').
More Vulnerable	• Hospitals. • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for: dwelling houses; student halls of residence; drinking establishments; nightclubs; and hotels. • Non–residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for • hazardous waste. • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.

Appendix B

The process to submission of a planning application and FRA assessment for those developments which are potentially vulnerable to flooding.


Identify vulnerability of proposed development land use type (see Appendix B)
Yes
Yes
Has the site been **allocated** for the proposed land use type in the Site Allocations DPD?
No
Ask the Council for the current SFRA and determine whether the proposed development have the potential to pass the Sequential Test and/or Exception Test as described on page 17 of this SPD.
No
Consider alternative development or alternative site
(Optional)
Consult the Council using the pre-application enquiry service. Does the Council confirm that the proposed development may be acceptable from a flood risk perspective?
No
Yes
Confirm with the Council or the EA whether a Flood Risk Assessment (FRA) is required and if consultation is necessary with flood risk consultees
Where applicable, undertake pre-application consultation with the flood risk consultees. Are there any known flooding-related site constraints which make the development proposed unviable?
Yes
No
Agree the scope of an appropriate FRA with the Council and the Environment Agency based on pre-application discussions. **Undertake FRA.** Is it possible to design a new development which is safe and which does not increase flood risk elsewhere?
No
Yes
Do the proposals fulfil the requirements of the Sequential Test? Has reasoned justification been provided to the Council wherever they need to apply the Exception Test. Have all contentious issues been discussed and agreed with the Council and flood risk consultees?
No
Yes
Submit application and accompanying FRA to the Council

Appendix C – Map of Policy Areas in Peterborough


Welland Catchment
Nene Catchment
Ouse Catchment
PETERBOROUGH
WHITTLESEY
STAMFORD
DUNDLE
Legend
Peterborough Unitary Authority Boundary
Peterborough Brooks System
Thorpe Meadows System
City Centre System Draining to the Nene
City Centre System Draining to Car Dyke
Padholme Strategy Catchment
Lower Nene Undefended Corridor
Orton Dyke System
Nene South System
Fletton Spring System
Stanground Lode System
Upper Nene
Welland
Middle Level Commissioners
Whittlesey and District IDB *
North Level District IDB
Welland and Deepings IDB
Main Rivers
Main Catchment Boundaries
* Whittlesey Internal Drainage Board (IDB) and Drysides IDB have amalgamated to become Whittlesey and District IDB. The diagram will be updated before Cabinet.

Appendix D – Flood and Water Management Measures

The table below shows the management measures that must be considered within each management area.

R = required
P = potential for – must be discussed with the relevant water management partners

Unit #	Policy Unit	Source control	Attenuation	Removal or significant reduction of surface water draining to combined sewers	Rapid discharge to the Nene (subject to evidence)	Discharge point	Partners that must be consulted on proposals.
		The control of the quality and, where appropriate, quantity of run-off at or close to its source, through site layout and management.	Attenuation reduces the rate and quantity of run-off reaching water courses. By providing passive treatment, these SuDS techniques can also improve water quality.	This measure applies to brownfield redevelopment sites where surface water has historically drained into combined sewers. Applicant will be expected to use SuDS and water reuse techniques to ensure that surface water runoff from the new development does not drain into the existing sewerage system, if at all possible. See appendix E for map of combined sewer locations. * = where the drainage pathway would be into a combined sewer.	Evidence must be submitted to demonstrate that there will be no negative impacts, especially during flood events, of the site's discharge going into the Nene without attenuation (but with source control for water quality).	In order to reduce the amount of surface water flowing to sewer systems, sites along the edge of either the urban area or village envelopes are encouraged to work with the local drainage boards to consider discharge into the IDB system as a more sustainable alternative to discharging into sewers.	
1	Undefended Lower Nene Corridor	R	P	R*	P	-	Peterborough City Council, The Environment Agency, North Level Internal Drainage Board, Anglian Water.
2	Upper Nene	R	R	-	-	-	Peterborough City Council, The Environment Agency, Anglian Water.
3	Welland	R	R	-	-	P	Peterborough City Council, The Environment Agency, Anglian Water.
4	Peterborough Brooks Catchment	R	R	-	-	P	Peterborough City Council, The Environment Agency, Welland and Deeping IDB; North Level IDB, Anglian Water.
5	Welland and Deeping IDB area	R	P	-	-	P	Peterborough City Council, The Environment Agency, Welland and Deepings Internal Drainage Board, Anglian Water.
6	Thorpe Meadows system	R	R	R*	-	-	Peterborough City Council, The Environment Agency, Anglian Water.
7	City Centre System draining to the Nene	R	R	R*	-	-	Peterborough City Council, The Environment Agency, Anglian Water.

Unit #	Policy Unit	Source control	Attenuation	Removal or significant reduction of surface water draining to combined sewers	Rapid discharge to the Nene (subject to evidence)	Discharge point	Partners that must be consulted on proposals.
		The control of the quality and, where appropriate, quantity of run-off at or close to its source, through site layout and management.	Attenuation reduces the rate and quantity of run-off reaching water courses. By providing passive treatment, these SuDS techniques can also improve water quality.	This measure applies to brownfield redevelopment sites where surface water has historically drained into combined sewers. Applicant will be expected to use SuDS and water reuse techniques to ensure that surface water runoff from the new development does not drain into the existing sewerage system, if at all possible. See appendix E for map of combined sewer locations. * = where the drainage pathway would be into a combined sewer.	Evidence must be submitted to demonstrate that there will be no negative impacts, especially during flood events, of the site's discharge going into the Nene without attenuation (but with source control for water quality).	In order to reduce the amount of surface water flowing to sewer systems, sites along the edge of either the urban area or village envelopes are encouraged to work with the local drainage boards to consider discharge into the IDB system as a more sustainable alternative to discharging into sewers.	
8	City Centre System draining to the Car Dyke	R	R	R*	-	-	Peterborough City Council, The Environment Agency, Anglian Water.
9	Padholme Strategy Catchment	R	R	-	-	P	Peterborough City Council, The Environment Agency, North Level Internal Drainage Board, Anglian Water.
10	North Level District IDB area	R	P	-	-	P	Peterborough City Council, The Environment Agency, North Level Internal Drainage Board, Anglian Water.
11	Whittlesey and District IDB area	R	P	-	-	P	Peterborough City Council, The Environment Agency, Middle Level Commissioners, Whittlesey and District IDB, Anglian Water.
12	Middle Level Commissioners area	R	P	-	-	P	Peterborough City Council, The Environment Agency, Middle Level Commissioners, Anglian Water.
13	Stanground Lode System	R	R	R*	-	P	Peterborough City Council, The Environment Agency, Middle Level Commissioners, Anglian Water.
14	Fletton Spring System	R	R	R*	-	-	Peterborough City Council, The Environment Agency, Anglian Water.
15	Orton Dyke System	R	R	-	-	-	Peterborough City Council, The Environment Agency, Anglian Water.
16	Nene South System	R	R	R*	-	-	Peterborough City Council, The Environment Agency, Anglian Water.

Appendix E – SuDS Information

A wide range of different SuDS approaches exist which can be used in combination or individually to suit the circumstances of different development sites. They can be split into several broad categories:

Approach to SuDS	Description
Prevention	This involves the prevention of run-off through the sensitive design and management of development sites. Preventative measures include limiting the extent of hard surfaces, rainwater harvesting and sweeping roads and car parks to remove pollutants.
Source Control	The control of run-off at or close to its source, through the use of SuDS including permeable paving or green roofs, can limit negative impacts associated with run-off.
Site Control	SuDS approaches can be development at a site scale, for example for an industrial estate, where run off from the entire site is directed into basins, soakaways, filter strips and filter drains allowing infiltration and passive treatment of the contaminated run-off.
Regional Control	Run-off from several sites, for example an industrial estate, retail park and housing development, can be directed into a pond or wetland site where it can filter into the ground which also enables its pollution load to be lessened. (NB the term 'regional' should not be confused with administrative regions, which are much larger).

Source: National SuDS Working Group (2004) Interim Code of Practice for Sustainable Drainage Systems.

The table above indicates that SuDS can be used in individual developments or as part of a strategic network involving a range of different SuDS techniques across a larger area. SuDS techniques perform one or more of four key functions which help to address water resource challenges and problems associated with conventional drainage in a different way (British Water, 2005):

1. Infiltration: Examples of infiltration SuDS techniques include permeable surfaces and soakaways such as trenches. By allowing water to drain into the soil, the quantity of run-off reaching water courses is reduced, and contaminated run-off can be treated.

2. Storage and attenuation: Examples of storage and attenuation SuDS techniques include green roofs and permeable pavements. They reduce the quantity of run-off reaching water courses, and also lessen the speed at which the water is transferred to water courses. By providing passive treatment, these SuDS techniques can also improve water quality.

3. Flow Control: Examples of flow control SuDS techniques include filter strips and swales. These help to slow the velocity of run-off water and

therefore reduce the risk of flash flooding. Moreover, they can encourage infiltration and the settlement of pollutants.

4. Treatment: Examples of treatment SuDS techniques include filter drains and wetlands that include reed beds. These work by improving water quality through promoting sedimentation, filtration, biodegradation and the absorption of pollutants by plants.

SuDS techniques, which often perform several of the four SuDS function, include:

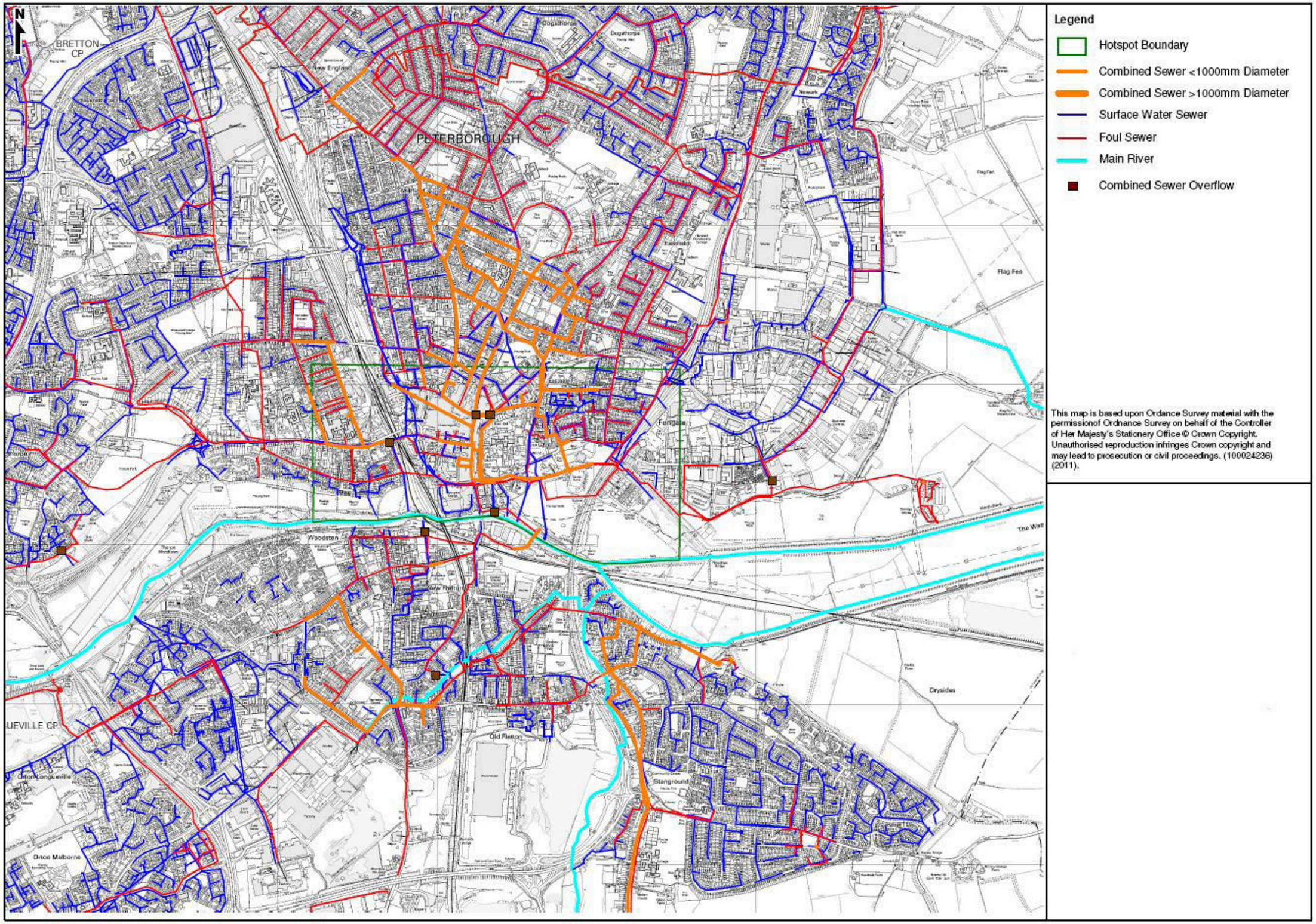
Technique	Description
Basins, ponds and wetlands	These devices, which are a key technique for site and regional control, receive and store surface run-off from other SuDS schemes within the surrounding area. They offer the benefits of attenuating the flow of surface water, providing a storage function, and improving water quality through filtration, sedimentation and biodegradation (for example, through the use of reed beds). Ponds and wetland, which usually retain water (in contrast to basins which are usually dry), can act as a wildlife habitat (for pollution tolerant species) and a focus for recreation activities.
Filter drains	Often linear drains filled with permeable material, these are a form of source control that can be used to improve the quality of water directed into them. They can also help to attenuate flow of run-off before it reaches a sewer or watercourse.
Filter strips	These are generally sloping areas of land, planted with grass and /or shrubs, and usually lie between a hard surface and a water body such as a stream or lake. Surface run-off is directed through the filter strip, thereby attenuating the flow, allowing for infiltration and the removal of pollutants. Filter strips and drains can be used in individual developments or as an element of a SuDS approach covering a larger site.
Green roofs	Roofs covered by turf can intercept rainwater at source, thus reducing run-off rates. They can also provide a treatment function by absorbing pollutants. Moreover, green roofs can encourage biodiversity.
Infiltration trenches and soakways	Where ground conditions are suitable, infiltration devices such as trenches or soakaways in urban parks can be used to facilitate the absorption of run-off generated across a development site. In doing so, they also improve water quality via filtration and by encouraging the breakdown of organic matter.
Permeable surfaces	Permeable surfaces act as a form of source control and can be used in urban areas for car parks and pavements. They are made from materials that allow infiltration, and also help to filter out pollutants and aid the biodegradation of organic matter.
Rainwater harvesting	Rainwater harvesting, such as collecting run-off from roofs in water butts, can provide water for non-potable uses such as flushing toilets and watering vegetated areas. It is a preventative measure as run-off volumes are directly reduced.
Swales	Swales are a form of source control. They consist of grass verges or channels designed to convey rainwater run-off allowing for infiltration, attenuation of flow and a reduction in sediment load and pollution levels.

Appendix F – Information required to support an application

For outline applications, the information required is set out in criteria 1 to 3. The information required in criteria 4 to 9 must be submitted for reserved matters applications. For full applications, all of the information detailed in the checklist must be submitted.

Criteria
1. Understanding SuDS Provide a clear explanation of the SuDS proposal.
2. Planning for SuDS Provide information on how the proposal meets the requirements of Core Strategy Policy CS22 'Flood Risk' and policies SPD1 and SPD2 of this SPD (including an initial data review of existing conditions, natural drainage, location of discharges, infiltration potential).
3. Outline proposals Provide information on how the scheme includes all of the following: • **Prevention** – minimise runoff, prevent pollution, contain spillages and manage silt • **Source Control** – show attenuation and pollution control sequence on site • **Conveyance** – describe flow routes, low flow recurrence intervals, extreme flood route • **Site or regional control** – based on catchment rather than at source
4. Detailed drainage design **Process** – demonstrate that quality, quantity and amenity design criteria have been considered equally **Detail –** demonstrate that drainage pathways reflect natural drainage patterns; and that maintenance can be carried out easily.
5. Critical elements Demonstrate that the following have been taken into account: **Prevention:** minimise run-off, prevent pollution, contain spillages, and manage silt. **Quality:** pre-treatment features to contain site and pollution, 'treatment stages' required, the management train principle, 'first flush', containment and treatment, groundwater protection. **Amenity:** evaluate community value, resource management (e.g. rainwater use), multi-use of space, education, water features, habitat creation, biodiversity action plans.
6. Health and Safety Statement Provide a risk assessment that considers collection devices, inlets and outlets, storage features, wetlands and ponds.
7. Construction: Site control measures through construction Provide the contractor method statement that outlines control of silt and other contamination during construction.
8. Management The following management information is required: Management plan, landscape maintenance schedule to include all SuDS features, review details e.g. inlets and outlets, provide site information sheet.
9. Sustainability Audit Review design components, scheme design life, resilience in use and future management.

Appendix G – Combined Sewers in Peterborough



Appendix H – River Naturalisation Measures

Potential mitigation measures	How river is used / reason for previous modifications	Modification or issue that requires management	Effect of mitigation measure
Re-opening of existing culverts and alteration of channel bed within culvert.	Urbanisation, land drainage, flood protection	Culverts i.e. closed channels	Improvements in diversity of habitat and species, better connectivity for wildlife.
Removal of hard bank reinforcement / revetment *or* replacement with softer engineering solution	Recreation, inland navigation, flood protection, land drainage, urbanisation	Hard bank protection e.g. steel piling, vertical walls. Includes hard bank protection in state of disrepair.	Return of marginal habitat[1]; better riverside connectivity for wildlife; reoccurrence of natural sediment movement – input at edges and build up in centre (might not be possible where channel used for navigation); return of wave energy absorption.
Preserve, and where possible, restore historic aquatic habitats	Recreation, inland navigation, flood protection, land drainage, urbanisation	Hard bank protection e.g. steel piling, vertical walls. Includes hard bank protection in a state of disrepair.	Return of marginal habitat[Error! Bookmark not defined.]; better riverside connectivity for wildlife; reoccurrence of natural lateral sediment movement – input at edges and build up in centre (might not be possible where channel still used for navigation); return of wave energy absorption.
Remove obsolete structure	Flood protection, land drainage, urbanisation	Dams, sluices, weirs and gravel traps	Return of natural longitudinal sediment movement where sediment moves downstream.
Re-engineering of the river where the flow regime cannot be modified	Water storage and supply	Managed flows (including compensation flows, regulation of flow, strategic water transfer)	Reduction in the adverse impacts on downstream river flows that have been created by the modification. Mitigation is necessary to maintain river habitats and their associated plants and animals.
Create or increase variation in channel shape e.g. by installing in-stream features such as riffles[2]	Inland navigation, flood protection, land drainage, urbanisation	The realignment, re-profiling and/or re-grading that has taken place e.g. to straighten channels.	Increase in the range of habitats due to different channel conditions
Bank rehabilitation / reprofiling	Recreation, inland navigation	Boat movement, disturbance and turbulence of surface waters created by passage of hull.	Less bank erosion and return of marginal and bankside vegetation.
Replacing flood walls with flood bunds (earth banks) to serve the same flood related purpose; setting back embankments, improving floodplain connectivity	Flood protection, land drainage, urbanisation	Flood walls, river being disconnected from its natural floodplain.	Regain of bank-side land habitat, of marginal habitat, of lateral connectivity for wildlife and of natural sediment input.
Enable fish to access waters upstream and downstream of current impoundment[3]	Water storage and supply, inland navigation, flood protection, land drainage, urbanisation	Locks, weirs dams, sluices and gravel traps	Return of connectivity up and down stream for plants, wildlife and habitats, less interference with fish migration
Measures to prevent fish being entrained (sucked) into the intakes of pumps/ e.g. addition of a screen in front of the pump.	Water storage and supply. Flood protection, land drainage, urbanisation	Pumping station operations	Entrapment and/or death of fish
Preserve and where possible enhance ecological values of marginal aquatic habitat, banks and bank-side habitat	Recreation, in land navigation, flood protection, land drainage, urbanisation	Hard bank protection e.g. steel piling, vertical walls. Includes hard banks protection in a state of disrepair, trampling and erosion of bank-side vegetation.	Regain of marginal and bank-side habitat; connectivity; sediment input; wave energy absorption; lateral sediment continuity (might not be possible where channel still used for navigation).
Sediment management, site selection for dredged material disposal. Manage disturbances (dredging and disposal)	Inland navigation	Sediment management	Prevent dredgings from being deposited on banks and creating an unnatural source of fine sediment in this location. Prevent smothering of floral and faunal habitats.
Appropriate vegetation control regime e.g. alternating bank vegetation clearance so there is always some	Inland navigation, flood protection, land drainage, urbanisation	Vegetation control methods or timings	Reduced physical disturbance of bed and banks. Reduction in the sediment input to the river that occurs when vegetation is disturbed.
Appropriate techniques to prevent transfer of invasive species	Inland navigation, land drainage, urbanisation, flood protection	Vegetation control	Prevent transfer and establishment of alien invasive species.

[1] Marginal habitats are the reed and grass areas along the edges of rivers, which are only partly in the water.
[2] A riffle is a bank of sediment installed across a river from bank to bank in order to recreate the natural variation in a river bed. This would for example provide somewhere for sigh to spawn behind.
[3] An impoundment is something blocking the flow of the river for a specific reason such as sluice, lock, dam or even a reservoir etc.

**Strategic Planning,
Housing and
Environment Team,
Stuart House (East
Wing)
St John's Street,
Peterborough.
PE1 5DD.**

This page is intentionally left blank