ABERDEEN CITY – SUSTAINABLE DRAINAGE SYSTEMS (SUDS) AND FLOOD DEFENCES

Countesswells Avenue, Retention Pond

A retention ponds function is for water attenuation (storing and slow release) and treatment. The culverts control the flow or water between the two ponds. The outflow goes into a culverted watercourse. The vegetation increases the micro-organisms in the water and other useful mechanisms in the system, thereby increasing the level of treatment. This site could be made more of a community feature, opening it up, adding benches and an interpretation board. Ducks were present showing increased biodiversity locally.
Countesswells, Swale

A swale is a conveyance system, aimed to keep the water moving. Best results are achieved if the vegetation is kept short, resulting in reduced friction. A gradual slope of 1-3 gradient on the sides is better. The lower the gradient, the easier it is to maintain and poses less of a safety risk. Geotextiles can be installed beneath the swale channel during construction with permeable or impermeable options available depending on design requirements. Geotextiles eventually deteriorate over time and those of a permeable nature will gradually clog. Pipes are generally installed at the inlet and outlet of a swale to convey water to and from the system, where pipe sizes can be specifically designed to increase the storage capacity of the swale in larger flow events.
**Stronsay Park**

Not designed as a SuDS, but being adapted to function as an attenuation basin. The natural berms and shape of the basin, result in water being held for longer in the park. A culverted outlet fitted with a sluice gate controls the flow of water running through from the Den burn. The culvert size was reduced to increase the storage capacity of the basin. This will tie into the Swale at Summerhill, with the outflow from the swale being slowed by a drop shaft and miniature wetland prior to discharge into the Denburn.
Maidencraig, Retention pond

This retention pond sits above the Denburn and the Den of Maidencraig Local Nature Reserve, across which a wetland flood alleviation scheme is to be eventually constructed. The retention pond exists as two basins separated by a culverted berm which allows for more controlled attenuation and increased treatment including particle settlement. The proposed wetland scheme meanwhile aims to serve several benefits: provision of a route to school to nearby Hazlehead Academy; prevention of further land erosion next to the existing route via channel diversion and construction of a cascading weir; increased and controlled flood attenuation across the nature reserve; and, enhanced habitat and public amenity provision.
Victoria and Westburn Park, Kerbed gully system / gravel kerb drains / geocell underground retention systems / attenuation basin

The roads have a steep camber and flood water quickly flows down Loanhead Place and gains speed and intensity through Watson Street and Cornhill Road. A kerbed gully system on Watson Street and two gravel kerb drains on Cornhill Road collect some of the water and convey it into a geocell underground retention system within Victoria Park and Westburn Park respectively. The geocell systems are lined with impermeable geotextile and discharge into the existing sewer system. A design flaw means the kerbed gully system on Watson Street does not catch as much runoff as it should. However, the manner in which it protrudes into the road accidentally causes a significant amount of runoff to be diverted away from Cornhill Road thereby reducing the flood risk there. Meanwhile, Westburn Park operates separately as an attenuation basin, where a small culverted outlet and sluice gate allow the Westburn to backup during high flows and store water within the park. A grating over the outlet traps any debris thus allowing for easier maintenance.
Seaton Park: Wetland

Flat and boggy ground, was excavated to make more dynamic. It tends to fill gradually over a large area. This has led to improvements in habitat and biodiversity. There is a clay layer under the adjacent rugby pitch that prevents the underlying drainage system from functioning properly, this may require attention.
Grandholm: Retention basin

Near site of old Grandholm Wooden mill, lade.

By the river Don. Built 5-10 years ago. Retention basin acts to slow down the water, allowing particles to settle, reducing pollution. Catches debris from road. Increasing organic particles and plants. A manhole is present to allow maintenance of the culvert that connects the two sections of the basin. This basin reduces the strain on the existing sewer system, increasing the capacity.