

Cambrian RainScape

Driver and Client Scope: Cambrian Sewage Pumping Station in Llanelli currently spills 52 times per annum (54,000m³) directly to the Loughor Estuary, a Designated Shellfish Water. It is a named National Environment Programme (NEP) Combined Sewer Overflow (CSO) output, with the driver to achieve 10 spills per annum by 2020.

Current Position

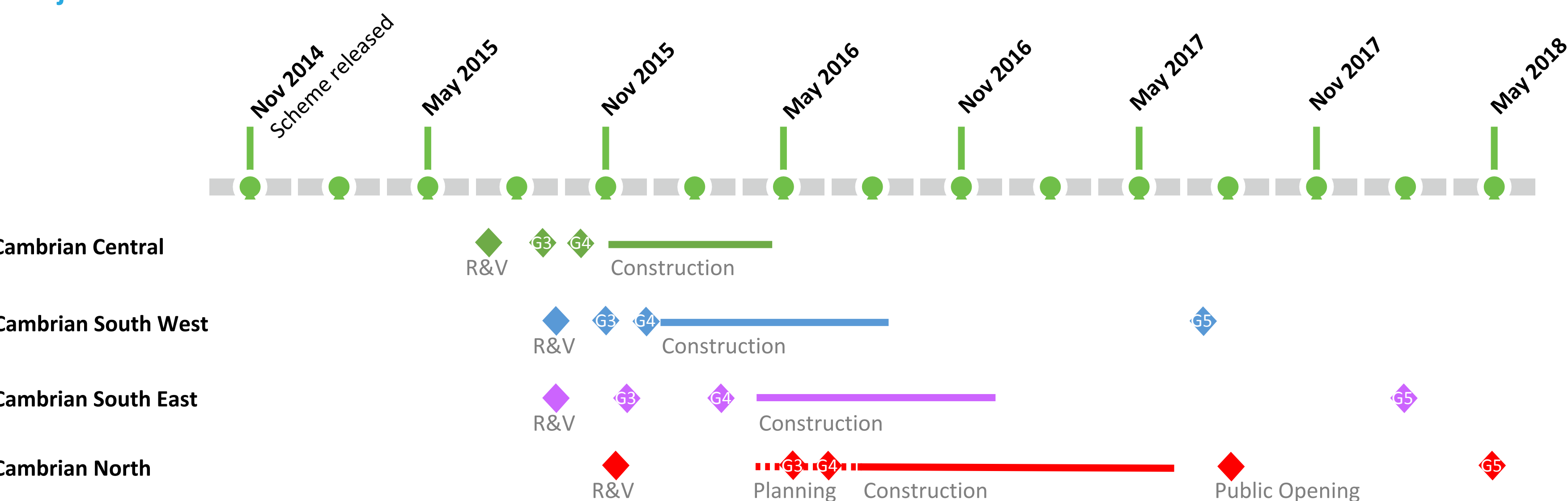
Cambrian SPS is a combined sewer catchment with a population of 4,500. Cambrian SPS pumps to Northumberland SPS and then onto Llanelli Wastewater Treatment Works.

The root cause of the CSO spills is a significant amount of surface water entering the combined sewer. Peak flows to Cambrian SPS are in excess of 1,600l/s in comparison to 10l/s of dry weather flow and a Pass Forward Flow (PFF) of 144l/s.

Options considered

- Three key catchment approaches were considered
- Traditional storage: 2,600m³ of traditional storage in the network. However, this would increase risks of spills to Shellfish Waters downstream and offers limited future resilience.
- Sustainable Drainage Systems (SuDS) only: 2,600m³ of SuDS attenuation to reduce peak flows in the network. However, the busy urban environment offered few open spaces to implement enough SuDS.
- Surface water removal: Creating a new surface water sewer alongside strategically targetted SuDS. This tackles the root cause by removing the fast response impermeable surface from the combined sewer.

Project Timeline



Solution Description

A catchment-wide 10ha surface water removal/attenuation RainScape solution has been delivered across all highways and 3 large buildings. This included 8km of pipework, 2 surface water outfalls and an attenuation basin.

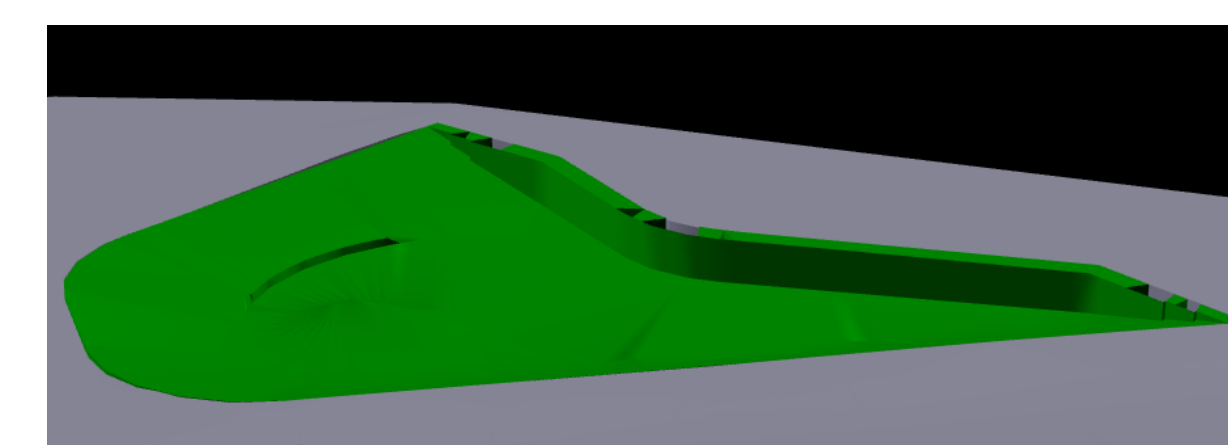
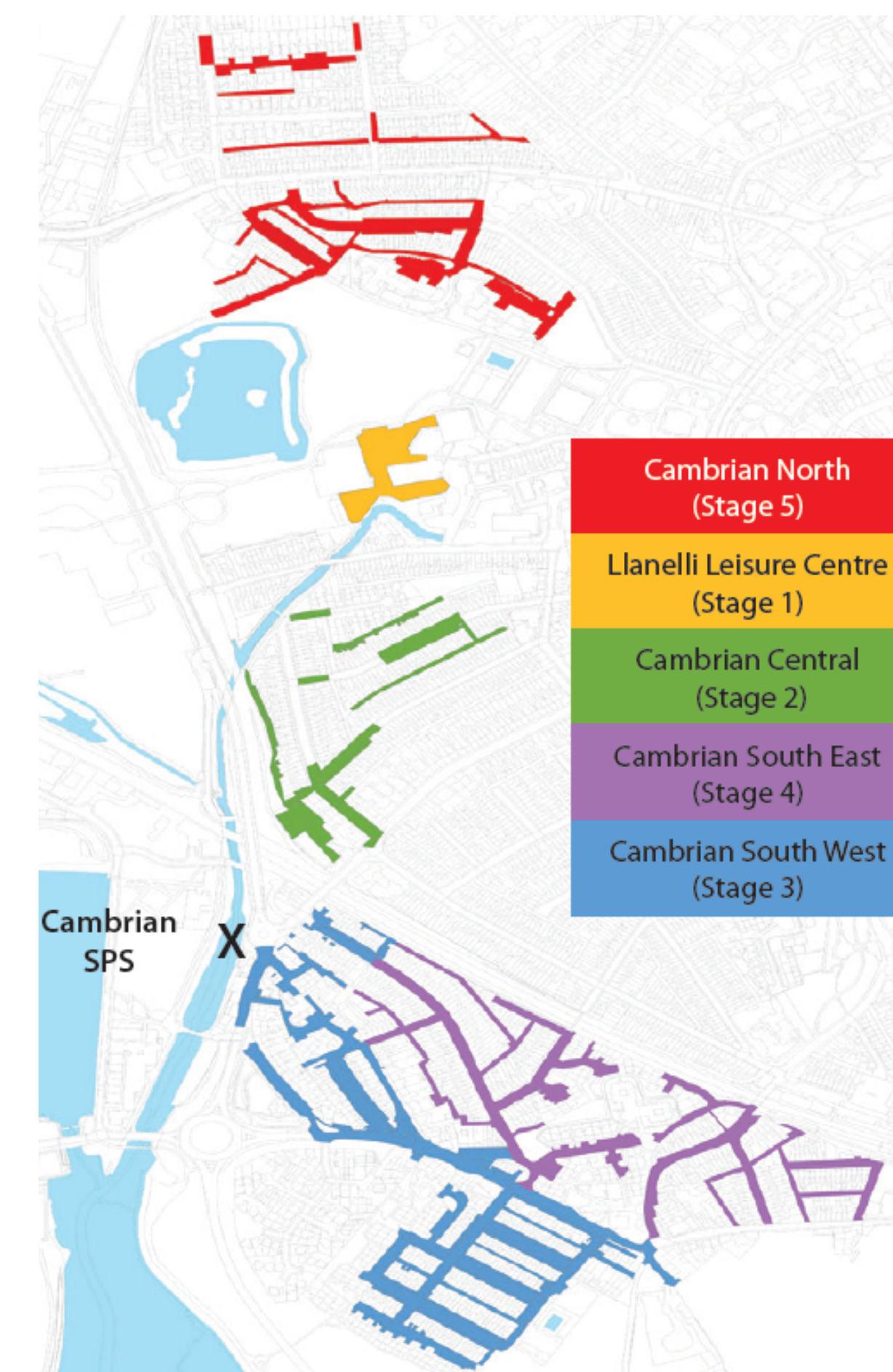
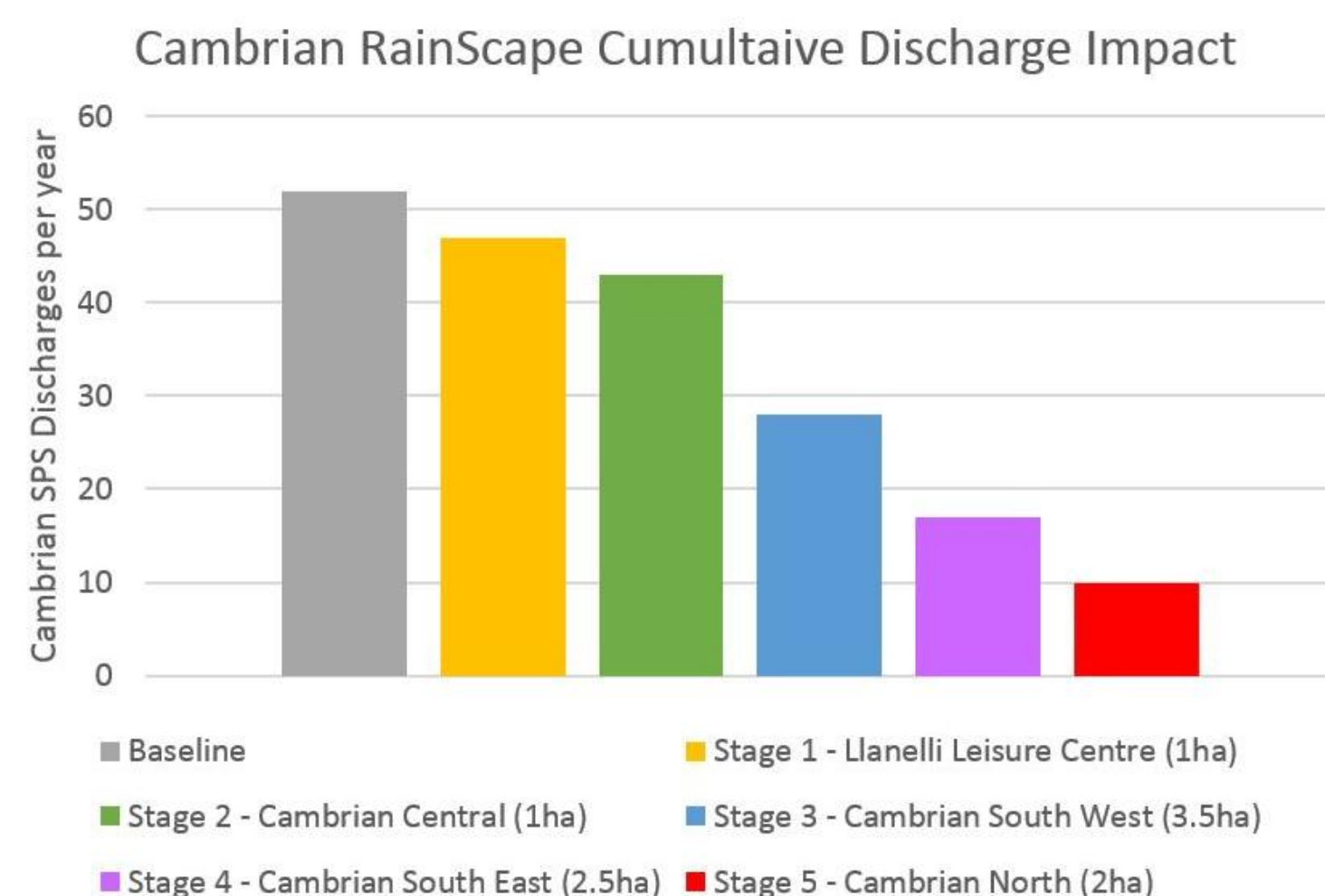
The programme was split into five elements of work; Cambrian Central, Cambrian South West, Cambrian South East, Cambrian North and Llanelli Leisure Centre. The Leisure Centre has been delivered by Carmarthenshire County Council.

The Cambrian North basin is lined and attenuates 200m³ of surface water releasing it slowly into the combined sewer. Notably it involved 3000m³ of earth movements and a 2m gabion wall.

Key Facts

Survey included 15 (No.) flow monitors, 6 (No. rain gauges) and 16ha of connectivity to inform the model and solution.

The 10ha RainScape solution has removed 125,000m³ of surface water from the combined sewer, reducing peak flows by 600l/s and the annual discharge volume by over 85%.



Spend Profile

Cambrian RainScape is part of the £26m Loughor Estuary IB, of this £5.2m BPT was allocated to Cambrian.

Key Design / Construction Considerations

Closely engaging Carmarthenshire County Council enabled the use of 2km of existing pipework and 2 existing outfalls. Programmes were developed in collaboration with the Council to minimise disruption, particularly important due to the significant extent of the works.

Notable design and construction challenges included a new outfall through a listed wall, the attenuation basin and encountering many utilities in the top 1m of road. Low ground levels in the catchment resulted in a 1.5m deep incoming sewer to the basin, which is located near to a landfill, next to a deep pond and has a high ground water level.

Benefits

As well as meeting the NEP spills driver there have been other benefits to the community. Many highways are now protected for a 1 in 30 year storm, where previously they were undersized for a 1 in 5 year storm.

The landscaped basin has delivered multiple benefits including a footpath, benches, 17 new species of plants and increasing biodiversity. It also provides an opportunity for the public to engage with water management.

Key Project Information

Delivery Type: Business Plan
SAP Code: DCWW.4597.S.202 All Stage 3
 DCWW.4592.S.212 Cambrian Central
 DCWW.4592.S.213 Cambrian South West
 DCWW.4592.S.214 Cambrian South East
 DCWW.4592.S.217 Cambrian North
Investment Case: 210 and 202
Primary MoS: B3 - Preventing pollution
STP: £11.5m
LBE: £
Direct cost breakdown: £7.9m