

Rainwise

Sustainable Drainage Solutions

Working with communities to
manage rainwater

Murton, North Tyneside



Murton is a small village that forms part of the wider urban area of North Tyneside. The village is in close proximity to the residential areas of West Monkseaton, New York, Earsdon and Shiremoor. The open space surrounding Murton, known as Murton Gap, is the location of a strategic development site that has been allocated in the North Tyneside Local Plan for the delivery of 3000 new dwellings.



Figure 1: Location of Murton Gap

The residential areas surrounding Murton Gap have a history of flooding, with the area suffering severely during an extreme storm event that affected the north-east of England in 2012, known locally as ‘Thunder Thursday’. This event saw thousands of properties affected and resulted in major transport routes becoming impassable across the region. A number of mechanisms were responsible for flood risk in the area, including the public sewerage system, surface water runoff, overland flows and minor watercourses draining the open fields of Murton Gap.

Figure 2 illustrates the drainage system prior to this project commencing and the distribution of flood risk from the various mechanisms. Several watercourses that drain the fields of Murton Gap connected to an existing surface water culvert in a residential area that had suffered surface water flooding. This issue was exacerbated by overland flows from the fields that were unable to properly drain due to incapacity in the culvert.

Further downstream, the surface water culvert discharged to the combined sewer network, in an area that had previously experienced both surface water and sewer flooding. The combined sewer network in this area also received surface water from the lake at Marden Quarry, a local nature reserve.

Surface water that entered the combined sewer network ultimately drained to Howdon sewage treatment works (STW) in North Tyneside. Maintaining the current drainage arrangement would have continued the unnecessary treatment of surface water, limiting the ability of the STW to accommodate foul flows from future development elsewhere in the drainage catchment.





Figure 2: Pre Project Drainage Arrangement



Figure 3: Post Project Drainage Arrangement

PROJECT DEVELOPMENT

Due to the existing flooding issues in the surrounding area, it was not possible to identify a sustainable drainage strategy for the strategic development site. In the absence of a sustainable drainage strategy, the delivery of the site and the North Tyneside Local Plan would have been compromised.

Initial plans to address the existing sewer flood risk included the construction of storage tanks on the combined sewer network by Northumbrian Water, whilst the Environment Agency medium-term plan included an indicative surface water flooding scheme consisting of local attenuation with discharge of surface water to the combined sewer network. It was however recognised that neither of the schemes proposed would facilitate the creation of a drainage strategy to enable the delivery of the strategic development site. Both schemes would also continue to discharge surface water to the combined sewer network for unnecessary treatment at the receiving STW, limiting its ability to accommodate growth.

By applying an industry-leading approach to flood risk management, Northumbrian Water and North Tyneside Council, as Local Planning Authority (LPA) and Lead Local Flood Authority (LLFA), were able to work collaboratively with developers and landowners to deliver an alternative scheme that would both address existing flood risk and facilitate the development of the strategic site. Frequent liaison between Northumbrian Water and the LLFA meant that both parties were aware of the existing issues faced by each organisation, which formed the basis and motivation for the identification of a collaborative and sustainable solution.

Key principles that influenced the project include:

- Early engagement in the strategic planning process provides the opportunity to identify and influence strategic water management opportunities.
- The fragmented nature of water management drives a need for a collaborative approach including the LPA, the LLFA, developers and landowners.
- A 'source to sea' approach facilitates the sustainable management of surface water – alleviating pressure on the combined sewer network.
- Sustainable drainage features should be implemented over traditional solutions to deliver multiple benefits where feasible.

The strategic development site at Murton Gap presented a number of challenges in terms of flood risk management that would have a direct impact upon both Northumbrian Water and the LLFA. It demonstrated the requirement for a collaborative approach to identify a solution that would address all elements of existing flood risk as part of one holistic scheme, in addition to demonstrating that the flood risk management authorities were able to proactively support growth through identifying and delivering a strategic surface water management scheme in partnership, in line with priorities identified in the Local Flood Risk Management Strategy.

The key components of the project are:

- Phase 1, North Cullercoats Flood Risk Reduction - The project included the construction of 750m of new surface water sewer to convey surface water that previously discharged to the combined sewer to the North Sea.
- Phase 2, Marden Quarry surface water separation - The disconnection of surface water from Marden Quarry from the combined sewer network and redirection to the new route to sea created in Phase 1.
- Phase 3, The construction of a sustainable drainage system (SuDS) corridor - to intercept and attenuate surface water draining from Murton Gap and to discharge it to the existing surface water sewer that drains to Marden Quarry
- Phase 4, Additional SuDS features to be incorporated into the area to be developed

The creation of a 'source to sea' link between the strategic development site and the North Sea results in surface water draining from Murton Gap being initially attenuated within a detention basin, reducing the risk of surface water flooding to properties adjacent to the site. Surface water is then conveyed through a swale before discharging to an existing surface water sewer.

The previous connection of this surface water sewer to the combined sewer network was removed as part of the scheme, and a connection to the sea outfall established, thus completing the link of a 4km surface water connection between Murton Gap and the North Sea.





Figure 4: Marden Quarry Surface Water Separation Project

Excellent working relationships with mutual trust enabled the delivery of a strategic surface water management scheme that addressed existing issues of sewer flooding and provided a viable surface water management solution to facilitate the development of the strategic housing site. Furthermore, the existing surface water flood risk was reduced as surface water flows are channelled to the SuDS corridor, through a detention basin and swale, to the new surface water outfall.

In addition to a reduction in surface water and sewer flood risk, the project has diverted surface water from unnecessary treatment at Howdon STW. The reduction in the amount of surface water discharging to the STW increases capacity at the works to accommodate foul flows from future growth in the drainage catchment.

The incorporation of the SuDS corridor enabled the delivery of additional benefits relating to water quality improvement, enhanced habitat, and amenity value, which would not have been provided through the application of flood risk management approaches traditionally utilised by sewerage companies, such as those schemes originally proposed.

CATCHMENT-BASED THINKING

The need for the wider catchment to be considered when solutions to address flood risk are developed. The project at Murton illustrated that the best and most sustainable solution to flood risk may not be located in the immediate location where the flood event is experienced. The application of a wider catchment-based approach allowed opportunities for the delivery of multiple benefits to be delivered.

IDENTIFYING OPPORTUNITIES THROUGH PLANNING

Early engagement in the strategic planning process is of critical importance to influence development proposals and ensure that a strategic approach to water management can be taken. Piecemeal involvement as parcels of the strategic development site came forward as individual planning applications would not have afforded the same opportunity to provide an overall solution.



COLLABORATIVE WORKING

It is important at the earliest possible stage to engage with developers and landowners to sell the benefits of them becoming collaborative partners in the project. In this case, the developers were encountering significant resistance to the development from local councillors and two well-organised action groups, who were objecting to the site's inclusion in the North Tyneside Local Plan on flood risk grounds. By engaging in the overall project, the developers were able to grant rights of access across land to lay pipes and even offer land for above ground flow attenuation, which otherwise may have been difficult to secure.

This led to all of the parties, including the developers, entering into a statement of common ground which demonstrated that the development could be delivered in a way that significantly reduced existing flood risk and that all parties were committed to its delivery. As a result of this collaborative approach, the matter of the strategic development site progressed in the examination in public of the North Tyneside Local Plan without further objection on flood risk grounds.

The coordination and delivery of the scheme between a number of parties required patience and perseverance, as progress with the project was not as swift as it may have been, had it been carried out by a single organisation. Additional time must be allowed for the different processes and approaches of various organisations, however this patience has been shown to be rewarded with a project that ultimately delivers a range of sustainable benefits that far outweigh the traditional, local approaches to water management that have previously been applied.



Figure 5: Marden Quarry



COMMUNITY ENGAGEMENT

Throughout the project, community engagement was important to ensure that customers had the opportunity to provide feedback and shape plans. This included the use of Northumbrian Water's community portal website, where live updates on the scheme were posted and customers were able to comment and directly interact with the project team. Consultation and awareness sessions were also held with local action groups and community organisations to explain the benefits of the scheme.

One particular challenge was the diverse range of groups who use Marden Quarry as each had their own concerns relating any potential changes to the levels of the lake.

TRANSFERABLE PRINCIPLES

Whilst the project at Murton Gap included a development site as a driver for a collaborative solution, the principles used are transferable and are applicable to a range of water management projects in various scenarios, not only those where a new development is proposed.

CONCLUSIONS

The Murton Gap project has demonstrated how the application of a collaborative approach to water management has secured a long-term, sustainable solution to flood risk management that would not have been achievable by the organisations involved working in isolation. It has illustrated that partnership working has enabled flood risk management across authorities, despite the fragmented nature of water management, and has also identified how flood risk management authorities are able to respond positively to the challenges associated with development pressures.

Active engagement with key stakeholders, together with excellent working relationships and mutual trust, presented the opportunity to identify a partnership solution that maximised the value of wider benefits associated with sustainable stewardship. The project highlights the important qualities and principles necessary to enable successful outcomes of a collaborative approach, and it is hoped that this case study will provide further encouragement for the application of a collaborative approach to surface water management.



Phase 1 North Cullercoats Flood Risk Reduction

Risk Management Authorities	Northumbrian Water North Tyneside Council
Consultant Engineer	MWH, Newcastle
Contractor	Esh Construction
Cost	£2.5 Million
Status	Construction commenced May 2015, completed March 2016

Phase 2 Marden Quarry Surface Water Separation

Risk Management Authorities	Northumbrian Water North Tyneside Council
Consultant Engineer	MWH, Newcastle
Contractor	Esh Construction
Cost	£2.5 Million
Status	Construction commenced March 2016, completed September 2016

Phase 3 SuDS Corridor

Risk Management Authorities	North Tyneside Council Northumbrian Water
Partners	Persimmon Homes, Bellway Homes, Northumberland Estates
Consultant Engineer	Capita
Contractor	TBC
Cost	£TBC
Status	Out to tender August 2017

Phase 4 Development Site SuDS

Risk Management Authorities	North Tyneside Council Northumbrian Water
Partners	Persimmon Homes, Bellway Homes, Northumberland Estates
Consultant Engineer	TBC
Contractor	TBC
Cost	TBC
Status	TBC