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# Highways Drainage and Flood Mitigation Improvement Plan

Summary Report

Stockport Metropolitan Borough Council

**FINAL ISSUE**



**STOCKPORT**  
METROPOLITAN BOROUGH COUNCIL

# Notice

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# Executive Summary

This report seeks to propose recommendations and a plan to improve on the current highways drainage and flood risk management programme. It involves analysis of Stockport Metropolitan Borough Council's (SMBC) current working approaches and methodology to understand how they are currently operating in terms of asset management and flood risk alleviation.

From this, recommendations have been made to provide SMBC options to improve on their current approach and how this may be implemented. Recommendations have been derived from existing knowledge of subject areas, potential innovations, other Local Lead Flood Authorities (LLFAs), councils, relevant authorities and best practice guidance.

Through analysis of SMBC's current processes, it has been identified that they are proactively progressing actions highlighted through a number of Section 19 reports which have been commissioned following flood events in 2016 and 2019. It also highlights how their current processes can be developed by adding additional information, integrating between departments more effectively and understanding alternative means for mitigation where value can be added.

The findings of the report are that SMBC have made substantial progress since 2016, specifically focussed towards their data collection mechanisms to help enhance their current systems/processes. As identified in the report, these processes can be improved by implementing eight key steps:

- 1. Continue to survey gullies and drainage assets, prioritised based on known flood locations.**
- 2. Develop flood prediction model to identify sites at high risk / impact if flooding occurs.**
- 3. Prioritise survey of assets and known and predicted high risk flood risk locations.**
- 4. Standardise data collection and recording of drainage assets into QGIS system; with the potential of degradation modelling further risk assess future interventions or inspections.**
- 5. Standardise format of flood incident recording and resident feedback.**
- 6. Improve information available to public on flood locations and ongoing flood mitigation activities.**
- 7. Investigate further funding sources, particularly for sites where funding opportunities have previously not been available for.**
- 8. Compare other highway improvement schemes against known or predicted flooding sites to identify opportunities to implement combined improvements and access potential funding sources.**

# 1. Investigation Summaries

## 1.1. Asset record improvements with a focus on high flood risk areas

The current method for reporting and recording inspections of the assets on SMBC's systems was reviewed, with options to improve the current reporting practices being provided. The review identified the good working practices undertaken within the highways team which were recording the inspections of their gullies on Kaarbontech's (Gully Smart) system, allowing the highways teams to get a quick oversight as to the condition of their assets in a visual format. This system allows inspections or cleans to be recorded in real time and updated into the system to allow SMBC to interrogate elements of the data (such as; silt levels, gully grate condition etc,) directly after upload.

There are further opportunities for SMBC to improve their data management practices, by consideration of the wider assets which can affect flood risk (including filter drains, ditches, other structures etc.). Currently, each department has a different process / software to record their asset inspections and the way in which these are being recorded. Highways and Structures are recorded on different platforms and the additional costs and inefficiencies between using varied systems in different departments has been identified as an opportunity for SMBC to improve. Also, SMBC has the opportunity to formalise their asset inspections between departments, using industry recognised grading systems, which can also help to inform residual life of the assets. This would allow SMBC as a whole to understand the condition of all of their flood risk/drainage assets easily, in one system.

### Recommendations

- Identify high priority assets within the borough by understanding the consequences of blockage of the assets and the potential damages associated with a flood event occurring at a street level from existing flood records and geospatial risk prediction of potential high-risk sites.
- Combine this with data being collected currently to understand which assets are likely to become impacted first to understand the risk profile of their assets, helping to further target areas for maintenance.
- Incorporate the same approach for all assets which may affect flood risk (culverts, ditches, bridges) to ensure these assets are operational prior to a flood event and be able to display this information easily through GIS. Develop an asset database within an integrated system to understand flood risk across all assets, not only road gullies and pipes.
- Identify the responsibility associated with the flood risk assets across the borough, many of the assets will be under riparian ownership and better information sharing with these residents so they understand their responsibilities as riparian owners. Many residents may not know they have any responsibility or know they have a flood risk asset on their property but these assets all combine to reduce flood risk so a greater level of detail would provide benefit to SMBC and its riparian owners.

## 1.2. Monitoring options for drainage maintenance/repair

SMBC Highways team have already begun an exercise in understanding siltation across the highways gullies for the borough. They are using the Kaarbontech system to update their records in real-time as the asset is being inspected. This was identified as an efficient approach and they should continue to do so in order to allow them to become more targeted in their maintenance regimes. Alongside this, SMBC should consider a risk prioritisation programme which can assist in understanding the consequences of asset failure in relation to the potential flooding impact. This would allow them to investigate further the root cause of wider asset operational or structural failure, i.e. not just which gullies are becoming silted faster. Wider departments could also integrate this mapping to realise where their most critical assets are, helping them to undertake more targeted inspections, to minimise the potential consequences of asset failure / flooding.

Furthermore, it was identified that SMBC faced issues surrounding inaccessible assets (mainly gullies) wherein the teams would go out to inspect the assets and find vehicles parked over, rendering the inspection incomplete. Both a digital and communications opportunity was identified as options to explore which could reduce the 12% of gullies which were inaccessible on the annual maintenance programme.

### Recommendations

- Incorporate additional information to help prioritise assets as part of the maintenance schedule.
- Interpolate information being recorded regarding siltation levels across the borough to understand which assets are at a higher risk of blockage and confirm that these assets are in locations which may generate high consequences of flooding.
- Investigate further the potential for reducing “vehicle overs” when inspecting gullies through communication strategies.

### 1.3. Options to mitigate flood risk, with a special focus on known areas of concern

Options for mitigation were identified from a planning, data and resilience perspective which aimed to increase resilience of properties or to elongate the time of response for the residents. SMBC have recently updated their systems for flood reporting on their website, which have improved the interface since its last update. It has enabled more streamlined reporting which can assist in the post-analysis of a flood event, with fewer errors anticipated compared to the previous system. Post-flood questionnaires are suggested which could collect a greater depth of information than and collate this in a more detailed format than is currently available. Additional comments can be uploaded onto the website when reporting a flood incident, but this information is supplied qualitatively, so may require additional time to interpret this data. An example was provided by Coventry City Council, which highlighted the ability to record additional information quantitatively, reducing the need for further post-analysis.

Improved resilience was suggested to assist residents in lessening the impacts felt from a flood event, this includes the provision of Property Flood Resilience (PFR). Measures were discussed in more detail in terms of their effectiveness in certain applications, but ultimately requires residents to have a PFR survey undertaken to understand the most appropriate measures at a property level. This was included with better monitoring/warnings on watercourses which can help to elongate the time to respond for the residents, which can either evacuate earlier or move valuables to lessen the damages associated. Wider resilience measures were also discussed, including temporary flood barriers which could be deployed during times of a flood to divert water away from properties.

Additionally, highways closures were identified as an area for improvement. The Main Report highlights the need for additional highways warning signs at the junctions of key highways which can be used to divert road users away from affected roads. This was suggested in conjunction with a digital tool which can be used to update road users in real time if one of the impacted roads was part of their route planning. Alternative routes could be automatically identified, and road users diverted, helping to prevent heavy traffic volumes at the junctions.

#### Recommendations

- Provide a post-flood questionnaire to better understand the flood incidents occurring and providing more information to ascertain potential solutions concurrent to the event.
- For areas which have left residents stranded in their properties, further engagement with them to develop the implementation of an emergency evacuation route to a higher area which could be used during a flood event to reduce the risk to life.
- Investigate costs associated with temporary resilience measures which could be actioned by the residents in areas that regularly flood in the interim until a flood risk management scheme has been identified or developed. Discussion with residents to understand how these measures would be funded.
- Implementation of a real-time application to update potential road closures on the network for times of flooding and investigate its cost effectiveness against installing additional fixed automatic signs. Such real time systems could serve to alert users in a more targeted way.

## 1.4. Opportunities to address deficiencies in the highways drainage system

Addressing deficiencies on the highways covered smaller scale works to provide a holistic approach to considering network deficiencies, including consideration of the wider catchment contributing to a network. Options to include digital tools to increase the efficiency of the programme are proposed. It had been highlighted that United Utilities (UU) had undertaken an exercise to understand the Sustainable Urban Drainage System (SuDS) opportunities across the borough. This should be investigated further by SMBC through a more detailed analysis at a town/ward-based level to greater understand the benefits of implementing SuDS solutions in key locations to directly remove runoff from entering the drainage network, therefore reducing potential consequences from flooding.

More comprehensive works including CCTV inspection of assets in high risk flood areas was considered with the suggestion of digital tools to automate the processes involved with understanding defects of culverts/pipework. This would either provide cost/time savings associated with this programme of works which could help assisting other programmes through the savings identified.

### Recommendations

- Identify areas with highest potential consequences if there is a blockage within the system and rank these assets for prioritisation by use of surveyed data and geospatial risk analysis. This can help ensure funds are being allocated on a risk-based approach.
- Undertake CCTV surveys of areas with high potential damages which can allow defects to be identified meaning remediation can be actioned earlier, potentially avoiding high cost repairs to assets which have failed.
- Display this information within the QGIS (Geographic Information System) system currently being used with a Red, Amber, Green (RAG) system to identify areas which are at higher risk of deterioration.
- Consider deterioration modelling of the assets once inspected to predict when further works may be required in future to help plan this programme of works in. This can assist in avoiding undertaking reactive repairs which are more costly than proactive management.
- In areas which would require higher costs to repair/upgrade the drainage network. Undertake assessment to identify potential SuDS schemes in the local area to reduce the reliance on the network as far as possible to mitigate against the network being overwhelmed. This can also assist in mitigating potential future impacts due to climate change. Funding for SuDS schemes is discussed in Section 2.6 however this is an area which may be beneficial to both SMBC and UU where the highway drainage system includes a combination of SMBC and UU assets.

## 1.5. Improved ways of communication with the public

Both digital and physical tools were identified as potential options for SMBC to improve their communication streams with the public, including warnings on highways. This was discussed also earlier in the report. Additional signage at the junctions in conjunction with a real-time digital navigation tool could both work in harmony to reduce the potential for road users to become stuck due to flood events. Furthermore, the report identifies opportunities for SMBC to engage with their residents better through increased reporting on the day-to-day activities which Stockport undertake, with examples of other Local Authorities who do provide this. Also, for SMBC to contain more information on the website which residents will come to as the first step in understanding their flood risk better. Information can include additional non-technical format reports which can outline the potential benefits and limitations of measures such as PFR. This kind of information is freely available and other LA's do include this level of detail on the website, which also presents the image of being more helpful in assisting residents understand flood risk.

### Recommendations

- Consider additional highways warning signs on strategic roads which are known to regularly flood without prospect of short-term remediation, this can help divert road users away from the impacted roads, reducing the number of cars attempting to drive through floodwaters.
- Use integrated mapping to alert users quicker to road closures and diversions where fixed signs are not practical or cost effective.
- Increase the promotional material available on SMBC website related to the works which SMBC are undertaking in the background to address flooding issues in the borough. Other LA's constantly promote the good work they are doing which SMBC could benefit from taking a similar approach.
- Consider undertaking additional work to translate the technical information contained within the reports into an easy read, non-technical format which residents can understand and interpret better.
- Introduce a post-flood questionnaire to help identify potential schemes subsequent to the events.

## 1.6. Available funding opportunities for flood mitigation and drainage maintenance

There are various funding opportunities available for flood mitigation and improvements to drainage maintenance including investment in green infrastructure. Prior to seeking funding opportunities, the key is to have a good evidence base of the flooding or drainage issue, the stakeholders involved and whether there are any partners who would support the securing of funding. The type and size of flooding or drainage problem will determine the potential funding opportunities and whether this is a simple application to fund, for example the replacement of a trash screen, or whether a more strategic approach is required through a planning or green financing mechanism to secure funding.

Delivery mechanisms can be through flood defence grants and natural flood management funding; opportunities through development and regeneration; opportunities through highways improvements; opportunities through partnership working and other innovative financing models.

### Recommendations

- This section has identified a wide range of funding sources which may be available to SMBC, including those already being pursued, and other potential ones. Each funding source will be based on a set criterion in relation to location, impact and context. Therefore, it is recommended that further investigations are carried out to match potential funding streams with particular sites or opportunities which may have previously been unviable through other funding mechanisms.

## 1.7. Phasing delivery

The approach to phasing delivery of the plan focused on realising the benefits of capital investment now, in order to build the knowledgebase about the condition of the assets across the borough, helping to inform the next stage, which is remediation. Opportunities were identified to share the initial costs based on the requirements of internal/external stakeholders who may benefit from things like traffic management being shared. This may enable some works which are currently not able to be funded by one party alone, but cross-stakeholder support may increase the viability of these kinds of projects. External stakeholders include utility companies, street cleaners and bodies such as UU.

This will enable SMBC to begin proactively targeting their assets which may involve small level remediation works before they develop into issues such as full asset failure, requiring higher level of investment to remediate.

### Key Steps

1. **Continue to survey gullies and drainage assets, prioritised based on known flood locations**
2. **Develop flood prediction model to identify sites at high risk / impact if flooding occurs**
3. **Prioritise survey of assets and known and predicted high risk flood risk locations**
4. **Standardise data collection and recording of drainage assets into QGIS system; with the potential of degradation modelling further risk assess future interventions or inspections**
5. **Standardise format of flood incident recording and resident feedback**
6. **Improve information available to public on flood locations and ongoing flood mitigation activities**
7. **Investigate further funding sources, particularly for sites where funding opportunities have previously not been available for**
8. **Compare other highway improvement schemes against known or predicted flooding sites to identify opportunities to implement combined improvements and access potential funding sources.**

## 1.8. Costs of the proposed programme identified

Costs were provided by SMBC for the **three-year** drainage investment programme with some key works identified such as CCTV and more localised gully repairs. In addition, costs were generated for potential projects for SMBC to take forward on the findings of the report, based on likely timescales and a prorated figure based on their anticipated yearly costs of external consultancy support. Costings included below.

### Costings

Table 2.1 – Drainage investment programme overview

Investment area	Cost (£)
Asset inspection and drainage system operational maintenance	3,070,300
Drainage network repairs	1,280,000
Site flood monitoring	130,600
Localised repairs to known flooding sites	100,000
Consultancy support	195,000
<b>Total</b>	<b>4,775,900</b>

Table 2.2 – External support programmes identified

Investment area	Cost (£)
Flood prediction model & prioritisation of assets (KS2* & KS3)	~ 25,000
Standardisation of data collection and recording of drainage assets (KS4)	~ 30,000
Flood incident reporting & engagement with resident feedback (KS5)	~ 15,000
Additional funding support (KS7)	~25,000
Detailed analysis of SuDS mapping (KS7)	~ 7,500
<b>Total</b>	<b>~ 102,500</b>

\* - Key step

Costs identified in Table 2.2 are intended to be high-level estimates of the likely fees involved for similar kinds of projects. They are not intended to be used for procurement, as this will be subject to a scope of works and a more detailed costings review. However, for the purposes of the report, they aim to provide a ballpark figure to the likely fees involved.

## 1.9. Cashable and non-cashable savings from the works identified

Cashable/non-cashable savings were identified and stated which may assist in the future funding of potential schemes. This could aid SMBC in quantifying additional, non-tangible benefits which could be included into the project costings to increase the viability of a scheme.

Examples of cashable savings include:

- Emergency costs.
- Reactive lane closures.
- Cost of minor repairs/cleaning against repair and replacement of a failed asset.
- Reduced disruption to road users (short term road closures for repairs rather than long term for major works).

With non-cashable saving examples such as:

- Possible reduction in carbon emissions and improved air quality by providing more sustainable alternatives to manage flood risk.
- Increased health and safety for road users who will benefit if the drainage network is being better maintained and fewer flood incidents.
- Possible improvement in biodiversity by greening the environment and providing more habitat across the borough in areas which previously were impermeable.

## 1.10. Future lifecycle planning and maintenance operations

The proposed improvement steps can be summarised into four key themes for SMBC to take in their progression of formalising a highways drainage and flood mitigation plan. This basis will allow SMBC to improve their proactive targeting of their assets based on their criticality to the network and funding available to limit the quantity of reactive repairs required.

### Key themes

- **Improved prediction of high-risk flood sites.**
- **Improved data collection at existing and predicted flood sites.**
- **Co-ordination with other departments/stakeholders to identify scheme opportunities.**
- **Investigate viability of a range of funding sources.**

## 2. Conclusions and Recommendations

This report provides a summary of the key issues highlighted within the main report and the opportunities for SMBC to benefit from a change in approach. Wider discussions will need to take place between departments to allow for a synchronisation of systems and approaches to reduce the inefficiencies between having multiple systems between various departments. The benefits of these should not be understated and may provide additional benefits from efficiencies.

Further work will need to be undertaken to assist in the prioritisation of assets. With limited funding it is becoming increasingly important to ensure that any investments made are undertaken in the most critical locations, helping to minimise the damages associated with flooding/asset failures.

Wider engagement with internal/external stakeholders should be explored further to allow for potential savings on schemes to be shared across parties and may expedite potential smaller scale works.

For areas where upgrades to the highways network appear unfeasible, smaller scale solutions such as SuDS opportunities should be considered to reduce reliance on the drainage network. These can reduce the importance of undertaking larger scale works but also serve to boost amenity across SMBC so provide an additional benefit from consideration of these schemes.

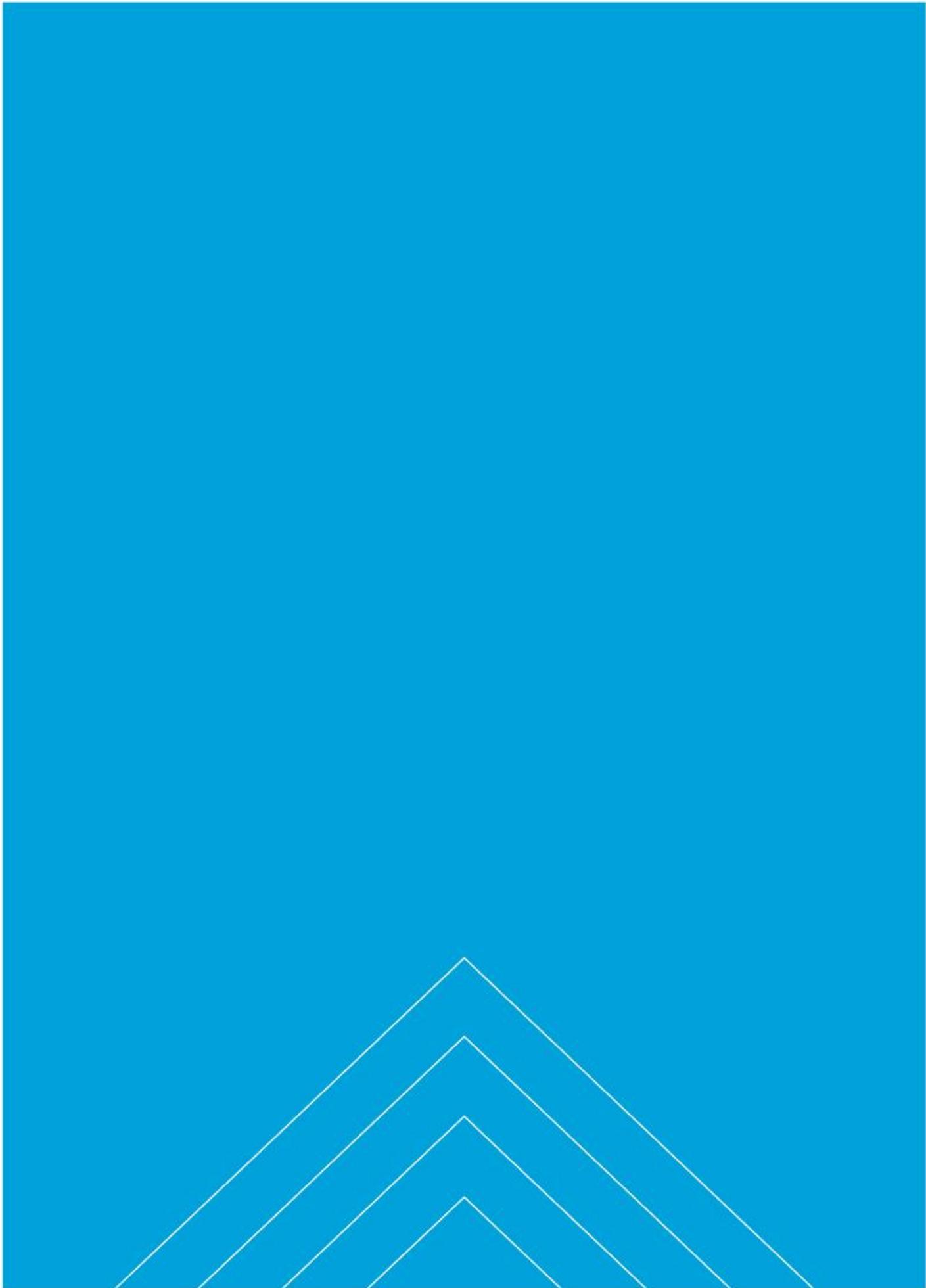
More promotional material could also be considered by SMBC to improve interactions with residents who will seek out actions undertaken by the council in their bids to mitigate flood risk. Other Local Authorities have been identified as including this level of information and appear to be undertaking substantial works within their boroughs. Despite SMBC undertaking similar levels of works themselves, without the promotional aspect of this, residents are not always aware of works being completed.

The improvement proposals have been condensed into several key steps for SMBC to undertake, to assist them in their highways drainage and flood mitigation improvement plans. Indicative costs have been identified, based on similar work carried out, which would need to be further refined to meet SMBC's scope and requirements.

### Key steps

1. **Continue to survey gullies and drainage assets, prioritised based on known flood locations.**
2. **Develop flood prediction model to identify sites at high risk / impact if flooding occurs.**
3. **Prioritise survey of assets and known and predicted high risk flood risk locations.**
4. **Standardise data collection and recording of drainage assets into QGIS system; with the potential of degradation modelling further risk assess future interventions or inspections.**

5. **Standardise format of flood incident recording and resident feedback.**
6. **Improve information available to public on flood locations and ongoing flood mitigation activities.**
7. **Investigate further funding sources, particularly for sites where funding opportunities have previously not been available for.**
8. **Compare other highway improvement schemes against known or predicted flooding sites to identify opportunities to implement combined improvements and access potential funding sources.**



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