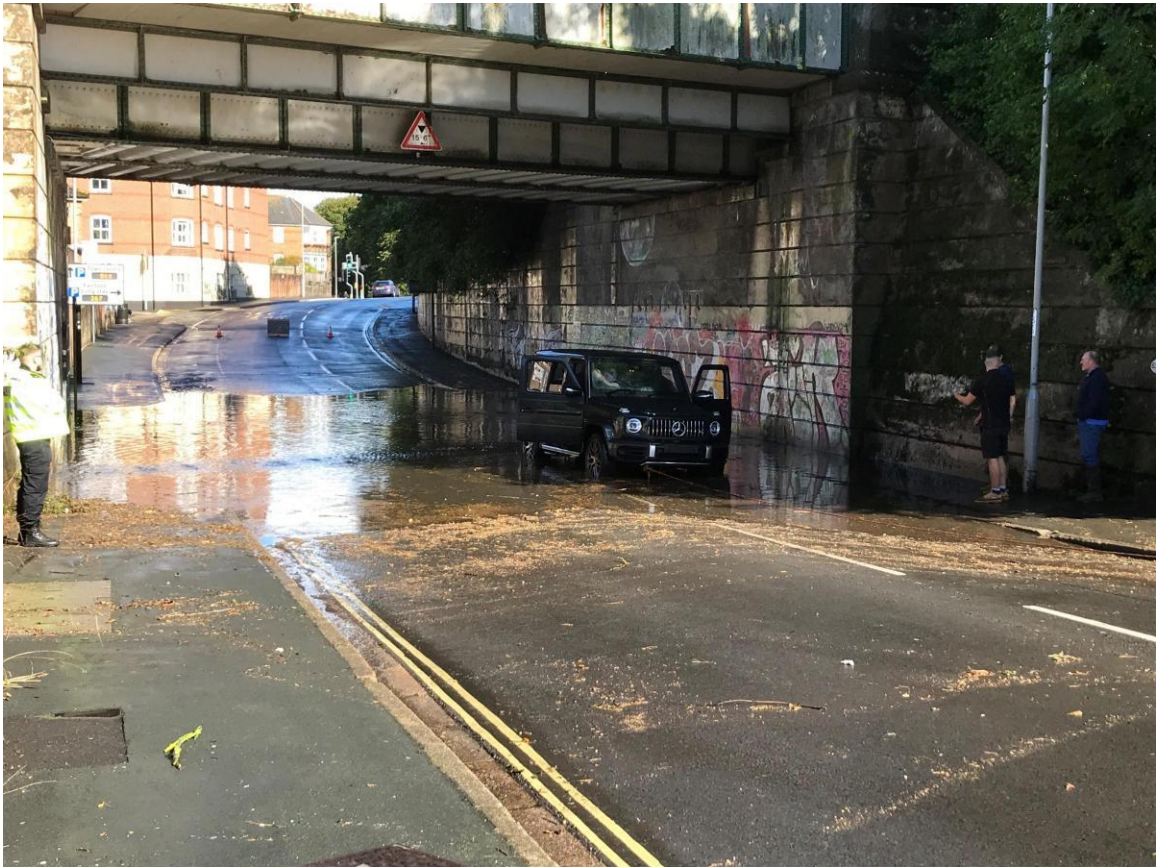


Flood Investigation Report



Dorchester
27th August 2020 Event



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1. Introduction

The Flood Risk Regulations 2009 and the Flood and Water Management Act 2010 (the Act) have established Unitary and Upper tier Local Authorities as the Lead Local Flood Authority (LLFA) for their area. This has placed a number of responsibilities on the LLFA in relation to flood risk management and in particular Section 19 of the Act which states:

Flood and Water Management Act 2010: Section 19 – Local Authorities: investigations

- 1) On becoming aware of a flood in its area, a lead local flood authority must, to the extent that it considers it necessary or appropriate, investigate -
 - a) Which risk management authorities have relevant flood risk management functions, and
 - b) Whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to the flood.
- 2) Where an authority carries out an investigation under subsection (1) it must -
 - a) Publish the results of its investigation, and
 - b) Notify any relevant risk management authorities.

When considering if it is necessary or appropriate to investigate a flood event Dorset Council (DC) will review the severity of the incident, the number of properties affected and the frequency of such an occurrence. Our Local Flood Risk Management Strategy clearly sets out the criteria to be used when considering a Flood Investigation Report; <https://www.dorsetcouncil.gov.uk/emergencies-severe-weather/flooding/managing-flood-risk/managing-flood-risk.aspx>

This report has been produced to comply with legislation and to determine the main causes of the flooding. Each affected area will have a number of recommended actions to be taken forward by the relevant Risk Management Authorities (RMA's) or in some cases, by the landowner or local community.

2. Risk Management Authority Responsibilities

The general Risk Management Authority (RMA) responsibilities in relation to flood risk and surface water management are outlined below:

The Environment Agency (EA) is responsible for managing flood risk from the sea, main rivers and reservoirs and has a strategic overview role for all flood risk management. It is a key local partner for Dorset Council, especially when managing the risk from combined sources and in the event of a large flood incident. The EA also provides a flood warning service throughout England and Wales in areas at risk of flooding from main rivers or the sea.

Dorset Council as the Lead Local Flood Authority (DC LLFA) is responsible for the management of flood risk from local sources, including ordinary watercourses, groundwater and surface water runoff. It is also responsible under the Land Drainage Act 1991 for consenting works and enforcing the removal of any unlawful structure or obstruction within ordinary watercourses. The LLFA must also prepare a Local Flood Risk Management Strategy, maintain a record of flood risk assets and undertake investigations. It is also a statutory planning consultee for the management of surface water drainage to major development sites (ten or more houses and commercial development of floor space greater than 1000m² or sites larger than 1Ha).

Since merging with the District Councils in April 2019, certain functions and responsibilities now come under Dorset Council as the new Unitary Authority. For example, the preparation of Development Plans, and offering discretionary comments regarding flood risk on minor planning applications. There are also powers under the Public Health Act 1936 to ensure the removal of any blockage within an ordinary watercourse that is considered a nuisance.

Dorset Council as the Highway Authority (DC HA) maintains the highway drainage system to reduce the amount of surface water generated on the highway. This is achieved by managing surface water via the maintenance of highway drainage infrastructure.

Water and Sewerage Companies (Wessex Water) Water and Sewerage Companies are responsible for managing the risks of flooding from surface water and foul or combined sewer systems including drainage from buildings and yards.

Highways England (HE) is responsible for managing, maintaining and improving the motorways and trunk roads across England and any associated drainage and flood risk.



Table 1 – Risk Management Authority Responsibilities

Flood Source		Environment Agency	Dorset Council – LLFA	Wessex Water	Dorset Council - Highways
Rivers	Main river				
	Ordinary watercourse				
Surface Water Run-Off	Surface Water				
	Surface water from highway				
Other	Sewer flooding				
	The sea				
	Groundwater				
	Reservoirs				

All RMAs have a duty to co-operate and to share information in relation to their flood risk management functions.

Land/Property Owners that have a watercourse in or adjacent to their land have riparian responsibilities on that watercourse. This means the landowner must:

- Let water flow through their land without any obstruction, pollution or diversion which affects the rights of others.
- Accept flood flows through their land, even if these are caused by inadequate capacity upstream.
- Keep the banks clear of anything that could cause an obstruction and increase flood risk, either on their land or downstream if it is washed away.
- Maintain the bed and banks of the watercourse and the trees and shrubs growing on the banks and should also clear any litter or debris from the channel and banks, even if it did not come from their land and to keep any structures, such as culverts, trash screens and debris grills, weirs and mill gates, clear of debris.

3. Catchment Characteristics

Dorchester is the county town of Dorset, with a population of 19,060. The town lies on the banks of the River Frome, at the junction of the A35 South Coast East to West trunk road and the A37 to the North. It also has direct rail links to London and Bristol.

Dorchester lies on a watershed, receiving water from two catchments. The northern half of Dorchester falls into the Frome catchment (205.7km²), with the southern half falling within the South Winterbourne catchment (55.09km²). The South Winterbourne later joins the Frome just North of West Stafford.

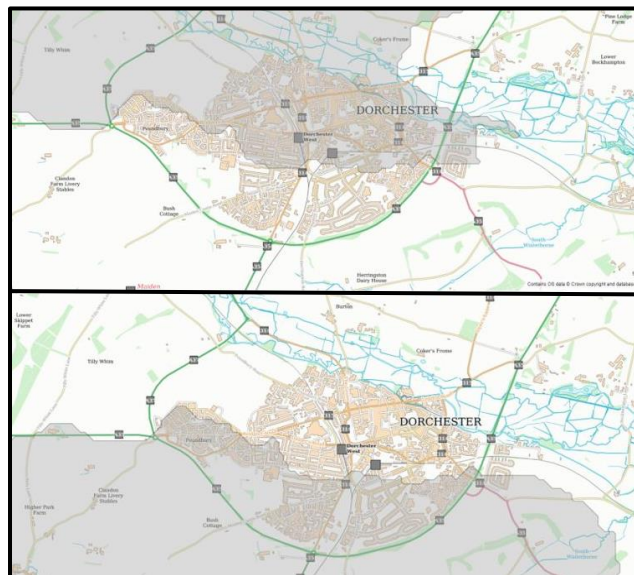
3.1 Geology

The Frome and Piddle catchment is characterised in the upper reaches of the North Dorset Downs by open chalk downland with steep scarp slopes, sheltered valleys, chalk hills, ridges and limestone plateaux, leading to flat-bottomed open valleys with clay and alluvial deposits at the lower end. The steep slopes at the top of the catchment lead to fast runoff responses to rainfall events. As gradients slacken and valleys broaden through the catchment, there is a more gradual response to run-off.

The upper area of the catchment is underlain by chalk geology up to 300m thick, which readily absorbs rainfall and transmits it to the groundwater, which in turn support spring and river flows. This chalk aquifer is used for public water supply.

The middle and lower areas of the catchment are overlain by up to 100m of mixed geology including clays that, in contrast to the chalk, do not readily absorb water allowing it to remain on the surface before discharging into the rivers.

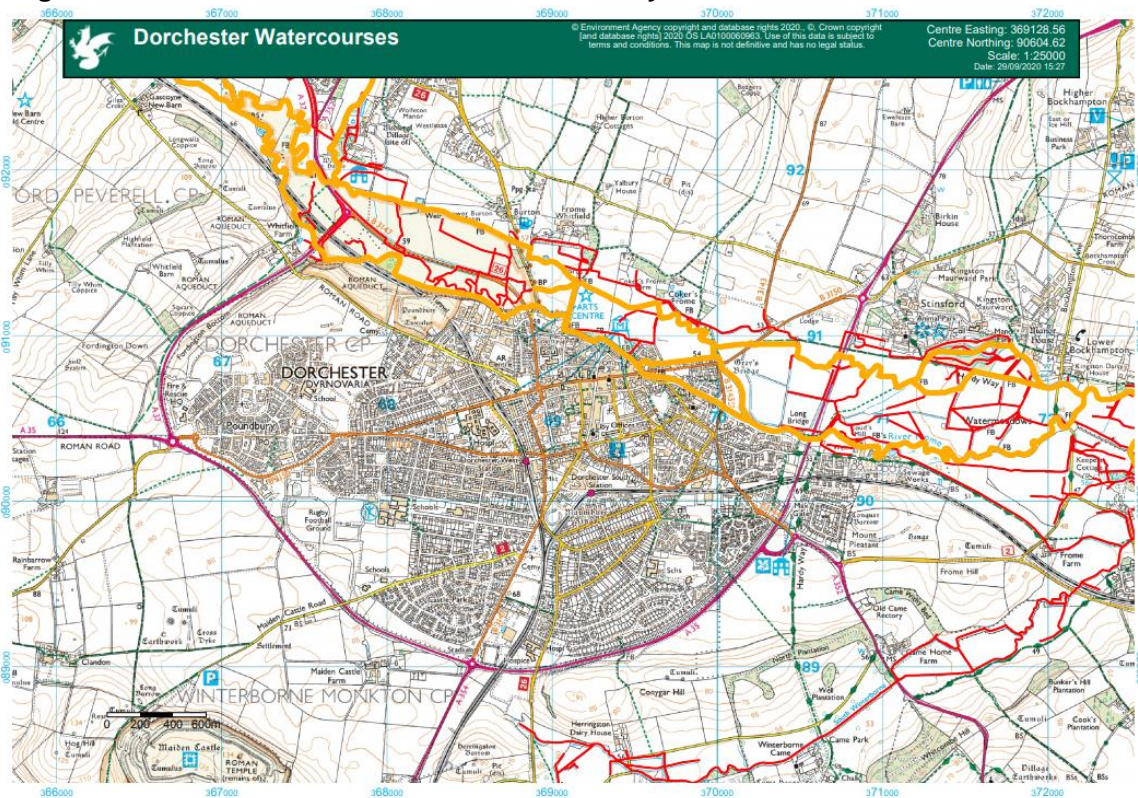
Figure 1 – Dorchester North and South Catchments



3.2 Hydrology

The river Frome flows into Dorchester from the North West, with the main channel flowing across the flood plains north of the town, meandering east. The main river then flows under the London Road bridge and along Lubbecke Way, continuing east out of the town. Before reaching the flood plain, the main river splits at Hangman's Cottage into the Mill Stream channel which flows along Frome Terrace with a separate channel filtering north-east before Swanbridge Court to re-join the main river before the London Road bridge. The Mill Stream continues to flow under Swan Bridge, along Malthouse Cottages before reaching Mill Street and Princes Bridge. The stream then re-joins the river before continuing out of Dorchester in an Easterly direction.

Figure 2 - Location of the Main Rivers and Ordinary Watercourses in Dorchester



3.3 Flood Risk

Due to the topography of the town, the majority of Dorchester is not at high risk of flooding. However, this event highlighted low-lying areas which are at risk of surface water and sewer flooding. This risk is heightened due to the more frequent and intense rainfall we are now seeing. It should be noted that the groundwater levels were low during this event.

There have been previous flood events in Dorchester, both fluvial, pluvial and groundwater, which have caused internal flooding. The most recent major flood was in July 2012, when a total of thirteen properties were flooded internally, mostly around Kings Road and the Mill Stream area.

3.4 Future Flood Risk

Climate projections for the next 100 years in the UK indicate that in the future there may be more short-duration high-intensity rainfall events and periods of long-duration rainfall may become more frequent. This may result in increased risk of flooding.

4. Incident Summary

Across the Wessex area, rainfall for August was 'above normal' for the time of year at 157% Long Term Average. Rainfall in the Frome catchment was 'notably high' in August at 180% Long Term Average. The month started dry, with rainfall concentrated in the second half of the month. 22% of the month's rainfall fell on 27th August. (*Environment Agency Water Situation Report for the Wessex Area: August 2020*).

During the afternoon of 27 August 2020, heavy rainfall fell on Dorchester and the surrounding areas. Unfortunately, the local rain gauge at County Hall failed during the event so it was not possible to derive local rainfall total / intensity with any degree of confidence.

Surface water flowed from the high points in the town via the highways towards the low points. These low points include Fordington, Evie Place, Olga Road and Weatherbury Way. The flow of water inundated the highway drainage system.

Residents reported concerns regarding:

- the maintenance of the drainage system and highway gullies
- the maintenance of the sewerage system
- bow waves from vehicles driving through flood waters

A total of eight properties experienced internal flooding as a result of the flood event, the affected locations are discussed in more detail in Section 4.3.

**Table 2 Summary of properties flooded,
(Based on numbers reported and brought to our attention during this investigation).**

Location	Number of properties flooded internally	Incident Date	Main source(s) of flooding during incident
Fordington	4	27/08/2020	Surface water
Olga Road	3	27/08/2020	Surface water
Weatherbury Way	1	27/08/2020	Surface water

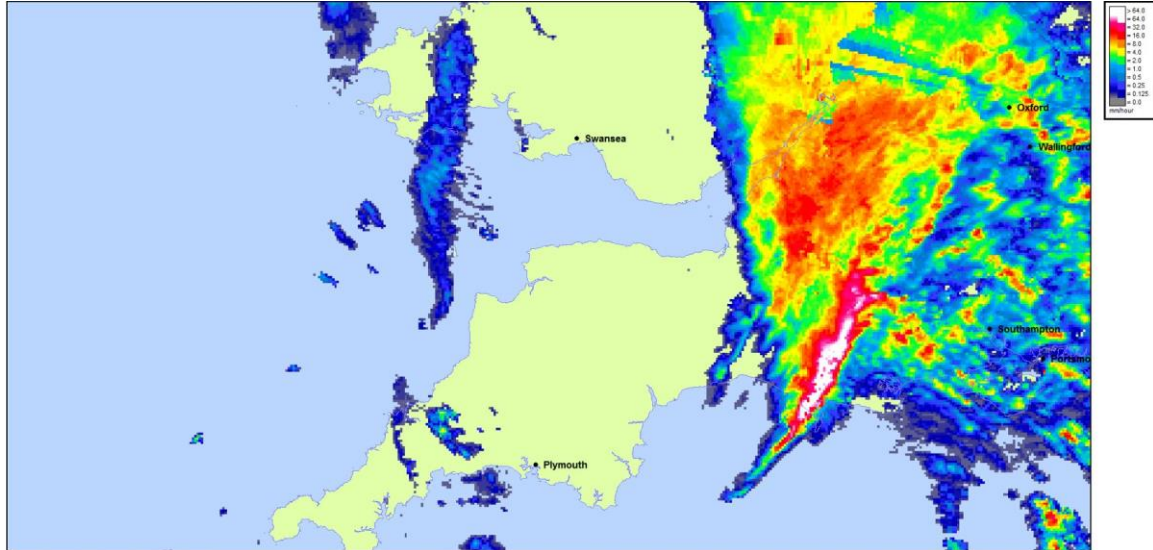
NB: It should be noted that this report is based only on the information brought to the attention of DC, it does not guarantee an exact list of affected properties during this flood event.

4.1 Rainfall data

Intense rainfall was evident in Dorchester on 27th August and supported by Met Office rainfall radar data. The radar data shows that there was an intense downpour between about 3:20 and 3:35pm, with an estimated 15mm falling in 15 minutes, equating to a return period of 1 in 9 years.

Unfortunately, the local rain gauge at County Hall failed during the event so it was not possible to derive local rainfall total / intensity with any degree of confidence.

Figure 3 - HYRAD Screenshot – Rainfall 15:25 BST, 27/08/2020



4.2 Groundwater Records

The EA maintains a network of groundwater monitoring boreholes across the country, which are used to monitor and inform management of groundwater resources. During August, monitored groundwater elevations were low as a result of limited recharge occurring in Summer as a result of the low rainfall. Groundwater flooding was not experienced during the event.

4.3 Locations Affected

This section provides site specific information on the main areas of Dorchester affected by the flood event.

4.3.1 Fordington/High East Street

Fordington is one of the lowest lying areas in Dorchester and has a history of flooding. It flooded in July 2012, and more recently in November 2019. The most vulnerable area is the junction between High East Street and Fordington High Street, at which the largest number of internal floods from this event occurred. It ponded at this junction as surface water rapidly built up and ran down High East Street. Surface water also flowed down High

Street Fordington and Salisbury Street. The highway drainage system was unable to cope with the flow of the flood water. Photo 1 shows the extent of the flooding in this area.

Flooding in this area was worsened for some properties by bow waves from vehicles passing through the flood water.

The redevelopment of the White Hart Inn site, now White Hart Mews, may also have exacerbated the issue. Surface water running down High East Street used to accumulate outside the pub, gradually draining into the Mill Stream. This is now not possible due to the redevelopment, causing a build up of water on the junction outside Gateway House.

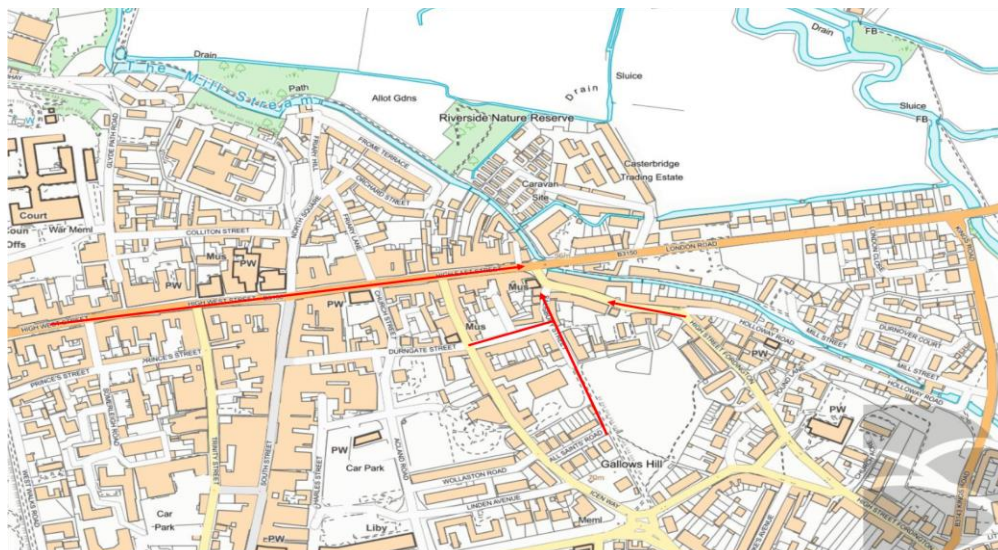
The condition of highway drainage system in the vicinity of Gateway House was also questionable.

Figure 4 below shows the flow paths for this area, highlighting the accumulation of water on Fordington High Street.

**Photo 1 – Foundry Place,
Fordington High Street**



Figure 4 – Overland Flow Paths, Fordington



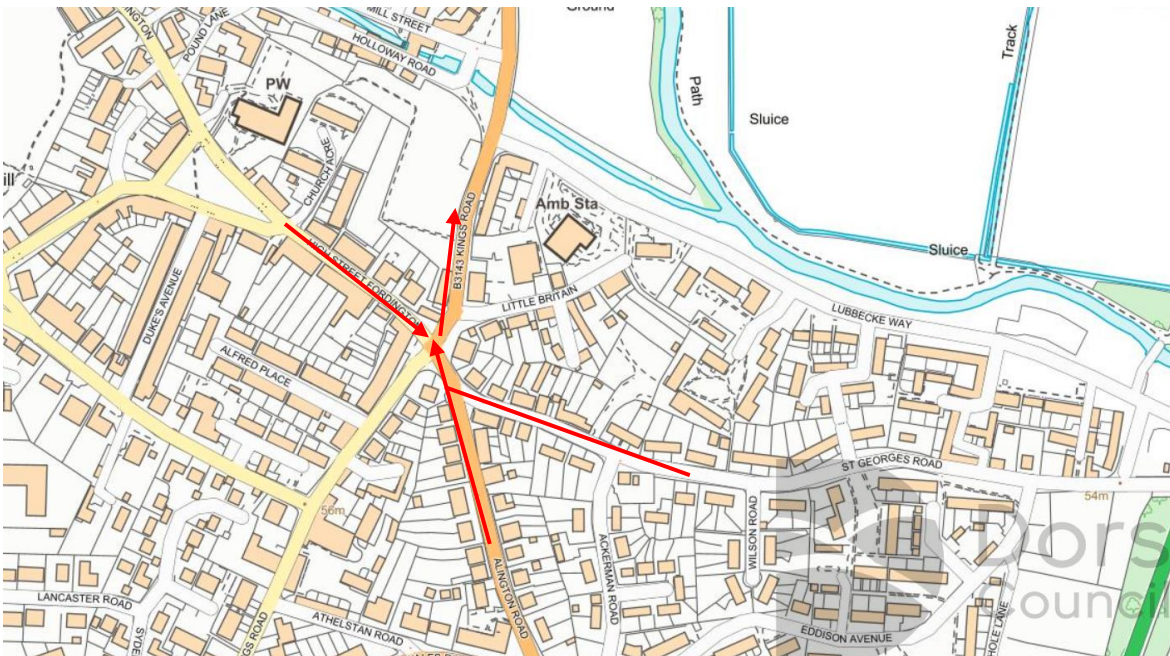
Improving Flood risk

DC Highways have reviewed and cleared their highway drainage infrastructure in affected areas and identified where further works are required.

4.3.2 Kings Road/Evie Place

This vulnerable location has a history of flooding. It is a low point in Dorchester, with overland flows coming from Allington Road, Kings Road and High Street Fordington. These steep flow paths resulted in an overwhelming of the public surface water sewer system, leading to accumulation of water at Evie Place.

Figure 5: Overland flow paths, Evie Place



Improving Flood Risk

A visit to site has been held with Wessex Water, who have since run a CCTV survey of their surface water sewer system. It was shown to be blocked, and Wessex Water have cleared their system of siltation. To prevent future blockages, they have added this drainage system to their regular maintenance schedule.

4.3.3 Olga Road

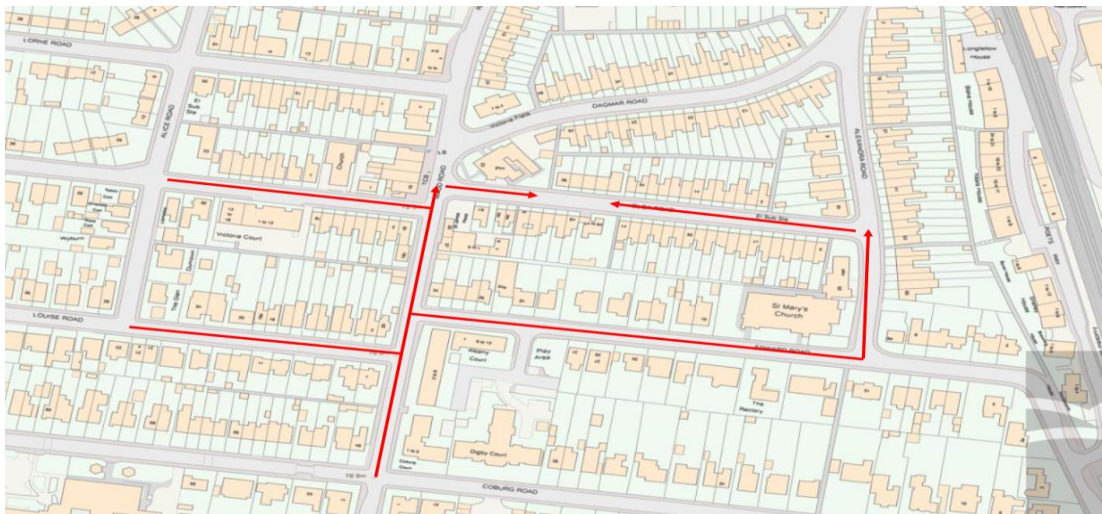
Olga Road is another low point in Dorchester, with overland flow paths converging between numbers 47-57 (Southern side) and 32-36 (Northern side). These flow paths come from Edward Road, Alexandra Road, Louise Road, Cambridge Road and Maud Road (Figure 5).

The main cause of this was again, the extremely heavy rainfall which lead to the Highway drains becoming overwhelmed. The system was unable to deal with the flow from the surface water run-off.

Photo 3 – Olga Road



Figure 5 – Overland Flow Paths, Olga Road



Improving Flood Risk

There is a high chance that even when cleared, the highway drainage may not cope with the flow of water. However, it is recommended that the gullies and drains are checked and maintained regularly to enable the free flow.

4.3.4 Weatherbury Way

Weatherbury Way sits at another low point in Dorchester, with Manor Park School sitting to the North East and a large embankment separating the area from the A35 to the South East.

Figure 6 – Surface Water Flood Risk for a 1 in 30 year flood event risk. Weatherbury Way properties in red area



The flow path runs down from the roads surrounding Weatherbury Way, accumulating on the green outside 112. The affected area is shown by the red shaded area shown in Figure 6.

Improving Flood Risk

It is recommended that Manor Park School ensure all drainage on site is clear and a maintenance schedule is adhered to. Highways have liaised with them to ensure proper maintenance is taken. Highways will also ensure all gullies are cleared regularly.

5 Quick Wins

As part of the on-going investigation, a number of quick win schemes to reduce the impact of flooding were identified. These could be implemented quickly by the RMA's or landowners within a short timescale and at relatively low cost. These have already been completed as this report has been progressed and are summarised in the table below:

Table 3 - Quick Win Schemes for Dorchester

Quick wins
<ul style="list-style-type: none"> • Wessex Water have CCTV surveyed the surface water sewer network around Evie Place and removed siltation blockage.
<ul style="list-style-type: none"> • Residents on Olga Road have researched and, in some cases, purchased property protection such as air brick covers.
<ul style="list-style-type: none"> • DC Highways have reviewed and cleared their highway drainage infrastructure in affected areas and identified where further works are required.
<ul style="list-style-type: none"> • DC Highways have liaised with Manor Park School on increasing drainage infrastructure and ensuring regular maintenance.
<ul style="list-style-type: none"> • Increased communications of online reporting tool FORT through DC social media, E-newsletters and internal comms.
<ul style="list-style-type: none"> • Rain Gauges will be checked regularly to ensure functioning to their full capacity. These will help record data of future events.

6 Recommended Actions

As a result of this investigation report, several recommendations have been made for actions to be taken in specific locations. These are either as a result of initial site or desktop investigations, or the continuation of works or investigations already in progress. There are also a series of general actions recommended to be considered in all of the locations.

Table 1 Recommended Actions for Dorchester

Action By	Recommended Action	How
Dorchester Town Council	Increase community resilience to flood events	The EA (with support from DC as LLFA) to help assist the TC with the development of a community resilience plan.
DC Highways	Ensure efficient operation of highway drains and culverts	Continue to review highway infrastructure and consider whether any other maintenance issues require regular attention. Specifically, junction of High East St. / Fordington High St. and Olga Rd. / Dagmar Rd.
Property Owners	Consider installing Property Level Resilience (PLR) measures to affected properties	Property owners to install PLR measures where necessary.
DC Highways	To explore improvements to the highway drainage network at junction of High East St. / in Fordington High St.	LLFA to work with Highways to develop a feasible scheme to ensure proper drainage.

Lead Local Flood Authority	Further improve Flood Risk Management communications to increase flood reporting and improve community flood resilience	Continue regular communications through social media, newsletters and targeted letters. Increase variation of platforms.
Lead Local Flood Authority	Review and monitor the delivery of recommendations within this flood investigation report	Via the reporting officer.
DC Highways	Ensure regular maintenance of Manor Park School drainage system North of Weatherbury Way	Develop and adopt a schedule for regular drain clearance
Wessex Water	London Rd to Kings Rd 450mm dia surface water sewer.	Carry out survey to ascertain adequacy and identify improvements
Wessex Water	28 Kings Road 225mm dia combined sewer	Investigate sewer surcharge and identify improvements
Wessex Water	Kings Road / Evie Place 450 and 460mm dia 2 X surface water sewers	Establish a regular (bi-annually) maintenance programme for de-silting

7 Next Steps

The next steps following this report will be for Dorset Council as the LLFA to ensure that the recommended actions are taken forward by the identified responsible organisations. It will monitor delivery through regular reviews, whilst working in partnership with the relevant authorities and the local community affected.

There is an expectation from DC of itself and its partners that all authorities involved will cooperate and work together to improve the flood risk in the vulnerable areas identified in this report by completing the recommended actions.



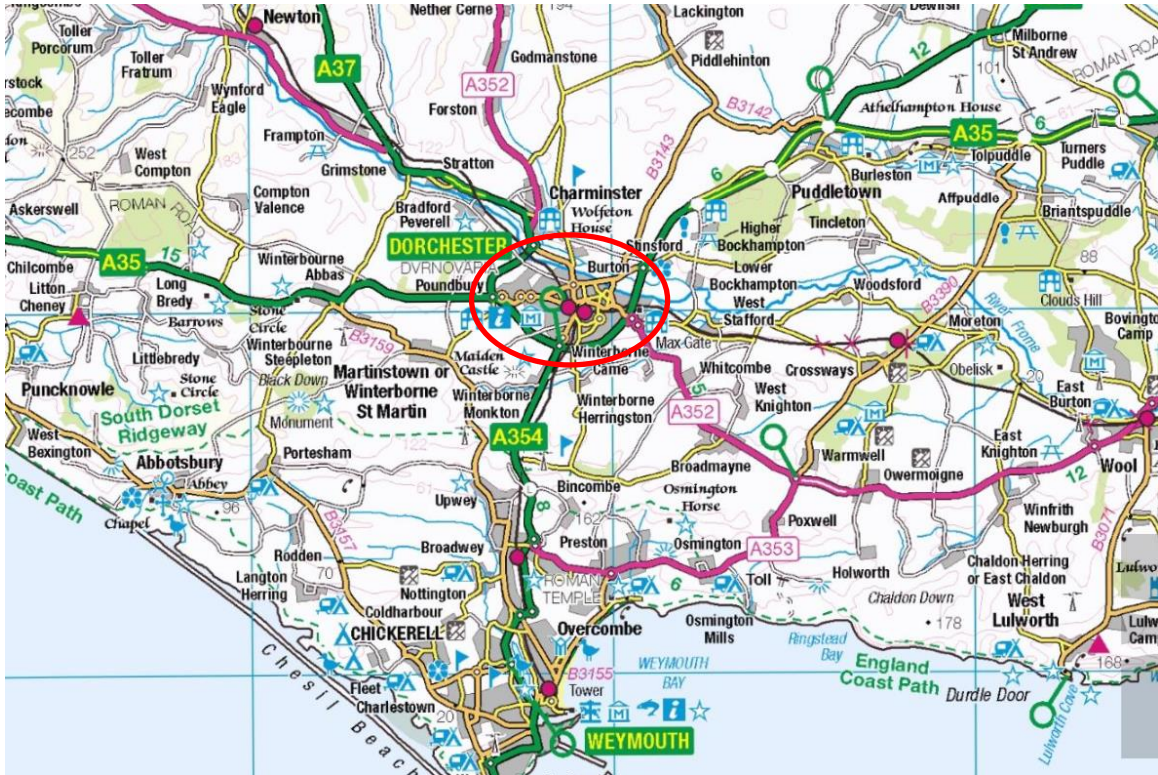
Where minor works and quick win schemes have been identified, these will be prioritised in line with other commitments. Any major works requiring capital investment will be considered through normal funding routes.

Appendix 1 - Term Definition

Catchment	An extent or an area of land where all surface water from rain, melting snow or ice converges to a single point at a lower elevation
Culvert	A covered channel or pipe designed to prevent the obstruction of a watercourse or drainage path by an artificial construction.
Fluvial Flooding	Flooding resulting from water levels exceeding the bank level of a river or stream
Groundwater flooding	Occurs when water levels in the ground rise above the natural surface. Low lying areas underlain by permeable strata (e.g. Chalk) are particularly susceptible.
Main River	All watercourses shown as such on the statutory main river maps held by the Environment Agency and the Department of Environment, Food and Rural Affairs for which the Environment Agency has responsibilities and powers.
Ordinary Watercourses	All watercourses that are not designated Main River, and which are the responsibility of local authorities or Internal Drainage Boards (IDBs)
Resilience Measures	Measures designed to reduce the impact of water that enters property and businesses; could include measures such as raising electrical appliances.
Resistance Measures	Measures designed to keep flood water out of properties and businesses; could include flood guards for example.
Surface water/runoff	Rainwater (including snow and other precipitation) which is on the surface of the ground (whether or not it is moving), and has not entered a watercourse, drainage system or public sewer. The term 'surface water' is used generically to refer to water on the surface.



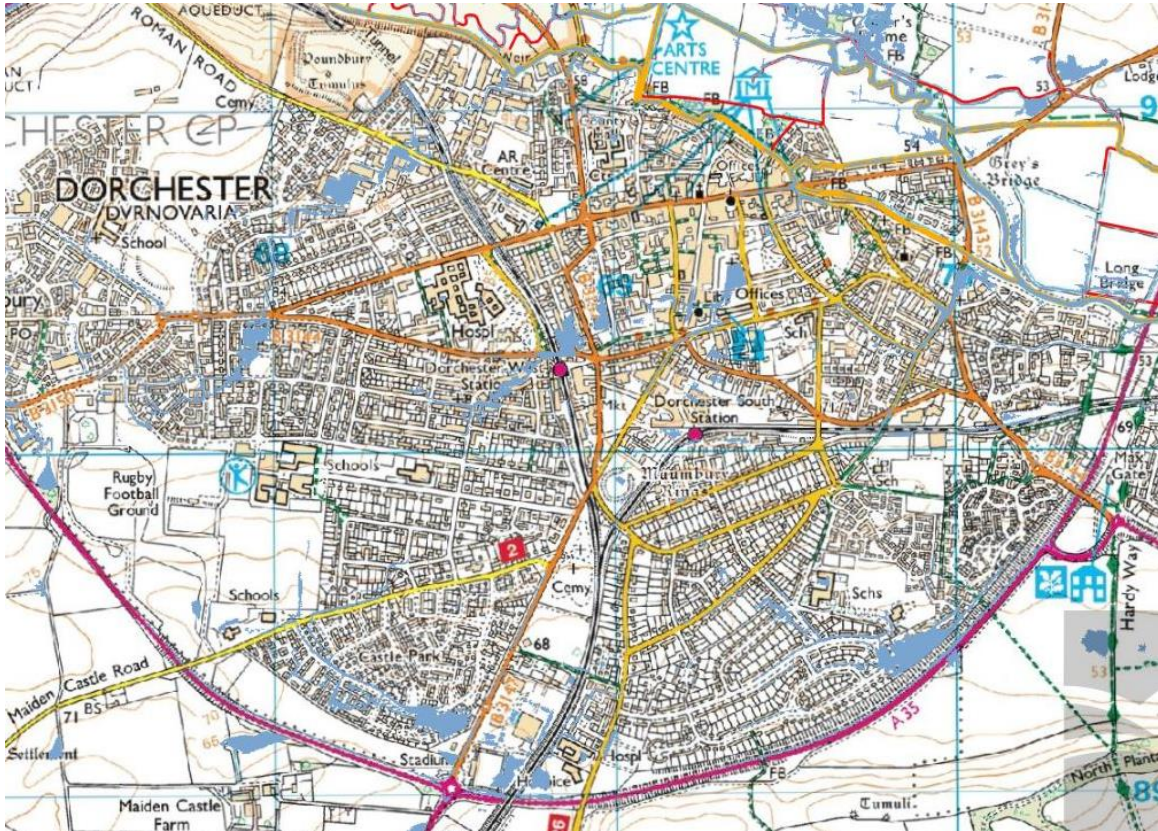
Appendix 2 - Location of the Study Area





Appendix 3 - Detailed Watercourse and Surface Water Mapping

(Surface water mapping showing a 1:100-year Flood Event)



Appendix 4 - Photos of Flooding Incident



Junction between High East Street
and High Street Fordington



High East Street



High Street Fordington