

Notice of meeting of

Guildhall Ward Committee

To: Councillors Clarke, Melly and Merrett

Date: Tuesday, 16 April 2024

Time: 5.30 pm

Venue: Outdoors, meet at the bottom of Peckitt Street

AGENDA

1. **CYC Operational Response to Flooding Events**
 - **Hear from and talk to your Ward Councillors and City of York Council Highways Officers**
 - **Feed your views and experience into a review to inform future operational practice**

See Report below;

**PECKITT STREET AND TOWER GARDENS FLOOD
OPERATIONS REVIEW**

Background

The Peckitt Street and Tower Gardens area of the city has been historically impacted during significant river Ouse flood events. Figure 1, below, shows the peak flood extents in the area.

Many homes and businesses have carried out work to make their properties more resilient to flooding.

The downstream area in Figure 1 is characterised by residential properties in Peckitt Street, Friars Terrace, South Esplanade and Tower Place and although all have floor levels significantly raised above those in Kings Staith / South Esplanade many properties have suffered from reoccurring flooding and have adopted Property Flood Resilience¹ (PFR) measures to reduce its impacts.

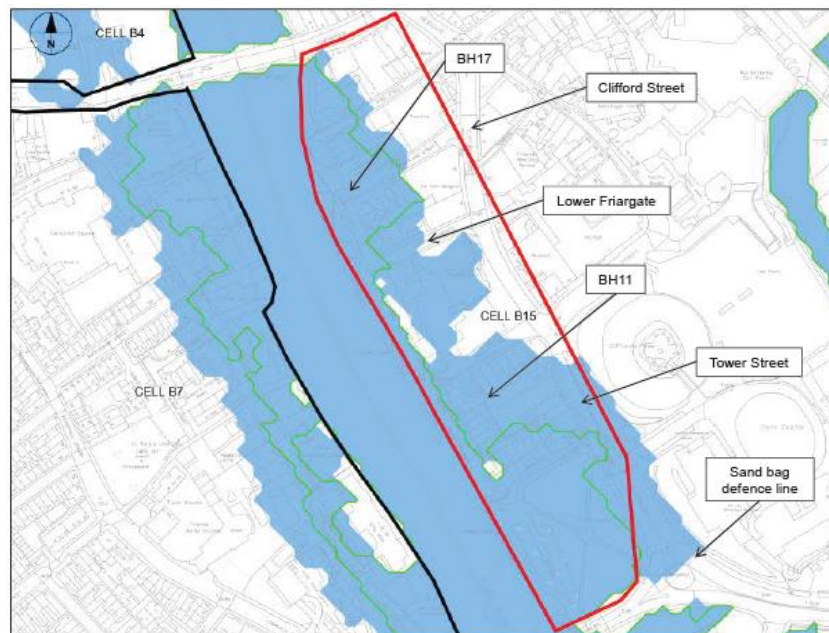


Figure 1 - peak flood outlines in cell B15 (BH11 and 17 relate to borehole records)

In addition to the individual flood resilience measures in this flood cell City of York Council has historically carried out temporary

1 PFR is property specific, resistance measures such as flood doors, air brick covers, waterproof renders etc prevent or slow down flood water from entering the property. Resilience measures such as solid floors, raised electrics, water resistant wall finishings etc reduce the damages when flood waters do enter the property.

sandbagging and pumping on Friars Terrace and Peckitt Street in numerous events since the November 2000 floods.

This procedure was successful against a river level of 4.42m above normal summer level at the Viking river level recorder. The operation was very labour intensive and potentially unsafe, involving the manual handling of hundreds of sandbags next to the river, often in darkness and rain, decisions to commence the construction had to be made on early river level forecasts due to the length of time needed for its completion, this often led to abortive works when peak levels came in below those forecasted.

Designs were developed following the 2008 floods to carry out works to raise the privately owned retaining wall in front of No's 8 Peckitt Street, 1 – 3 Friars Terrace and 1 – 5 South Esplanade to make it more watertight against river flooding and to raise the wall along this length and the Council owned highway retaining wall at the end of Peckitt Street. Pedestrian access at this point was maintained through the inclusion of demountable flood barriers.

The justification for the project was on the grounds of safety, resource efficiency and reliability, and it was made clear that this would provide protection up to a river level of 4.7m (this was communicated widely with the community at the time), a significant improvement over the previous temporary works. The works were part funded by the Yorkshire Regional Flood Defence Committee (now the Yorkshire Regional Flood and Coastal Committee). The works were completed in early 2010.

The new flood resilience measures worked effectively and were fully tested with two significant flood events in 2012. The operational response at this location normally requires sandbags and pumps to be deployed to minimise the impact of seepage through the drop boards but decisions were taken to significantly increase the extent of this operation in response to forecasted levels in November 2012. At the time these were predicted to be the second highest on record. The defence was raised via a sandbagging operation which raised the level of protection to c. 5m.

The post flood review considered that this operation was not carried out with due regard to safety. The risk of sudden failure could have put the workforce, both Council and military, members of the public and properties at

unacceptable risk. It was therefore agreed that the operation should be reviewed, and no additional sandbagging should be carried out in an attempt to raise the defences.

This decision was communicated to the community and during recent significant flood events in 2015, 2020, 2021, 2022 and 2023 forecast levels have all predicted that the flood resilience measures here will be overwhelmed and evacuation plans have been enacted. The stress and emotional impact on the community are apparent during these periods.

City of York Council have regularly deployed a further sandbag wall across the entrance to Tower Gardens to prevent flood waters flowing on Tower Street during lower order flood events, this maintains access on this key route into the city. Pumps are deployed to prevent the build up of flood water in Tower Place.

Winter 2023/24 Flood Response

The winter of 2023/24 to date has been challenging for many communities, businesses, and incident responders across many parts of the country. Unlike areas to the south of the county York has avoided widespread flooding although the localised impacts in several communities, including the Peckitt Street/Tower Place community, has been apparent.

To date the UK has experienced 9 named storms during this winter period, 7 of these have led to operational response actions in York and the cumulative impact on the operational response capability of the Environment Agency, Yorkshire Water and City of York Council has been considerable.

All partners rely on river forecast information to trigger their responses, in some cases operations can take time and resource to mobilise and early forecast accuracy is key to ensure timely and effective responses can be made. Forecast information is disseminated to all through the Environment Agency's online service, a graph of the 5 day trend, the current level and the forecasted level (up to 18 hours in advance) is shown.

A significant number of factors affect the accuracy of the forecasts, York sits at the base of a 3500km² catchment with the rivers Swale,

Ure and Nidd combining to form the Ouse just upstream of York. The forecasting models need to balance the potentially varied advance forecast rainfall inputs across all three river catchments, antecedent conditions, the impacts of secondary storm fronts, snow melt etc to provide an early peak river level forecast at the Viking Recorder. As actual rainfall levels are known and upstream telemetry gauges record peak levels the downstream forecast becomes more accurate.

In addition to the 'raw' forecast outputs provided online responders working across York receive additional information from the Environment Agency which may often give an amended level based on their confidence in the forecasted rainfall, snow melt or other factors. This information is reviewed in operational or tactical level meetings and supports decisions on operations and the deployment of defences.

This confidence level may lead to uncertainties in the timing of the peak or it's absolute level, historically this degree of error has reduced as the catchments rivers respond to rainfall and upstream levels peak. Early forecasts in York have historically over predicted the peak flood level and have seen the timing of the peaks delayed from initial predictions.

However, the forecasting for the Viking Recorder has not always followed this trend in a number of flood events over the last 12/18 months. Although the timing of the flood peak has not always deviated we have observed peak flood levels in excess of the earliest 'raw' forecast based on predicted rainfall and catchment modelling assumptions.

Figure 2 below has been collated from this winters river level data to illustrate this issue further, this provides the daily maximum value for the Viking Recorder over the main period of this winters flooding, a selection of forecast levels has been taken from a range of operational reporting sources and has been superimposed on the flood peak that it was forecasting. No attempt has been made to show the temporal variance of the forecasted time/date of peak and all forecasts have been assimilated against the actual forecast peak level.

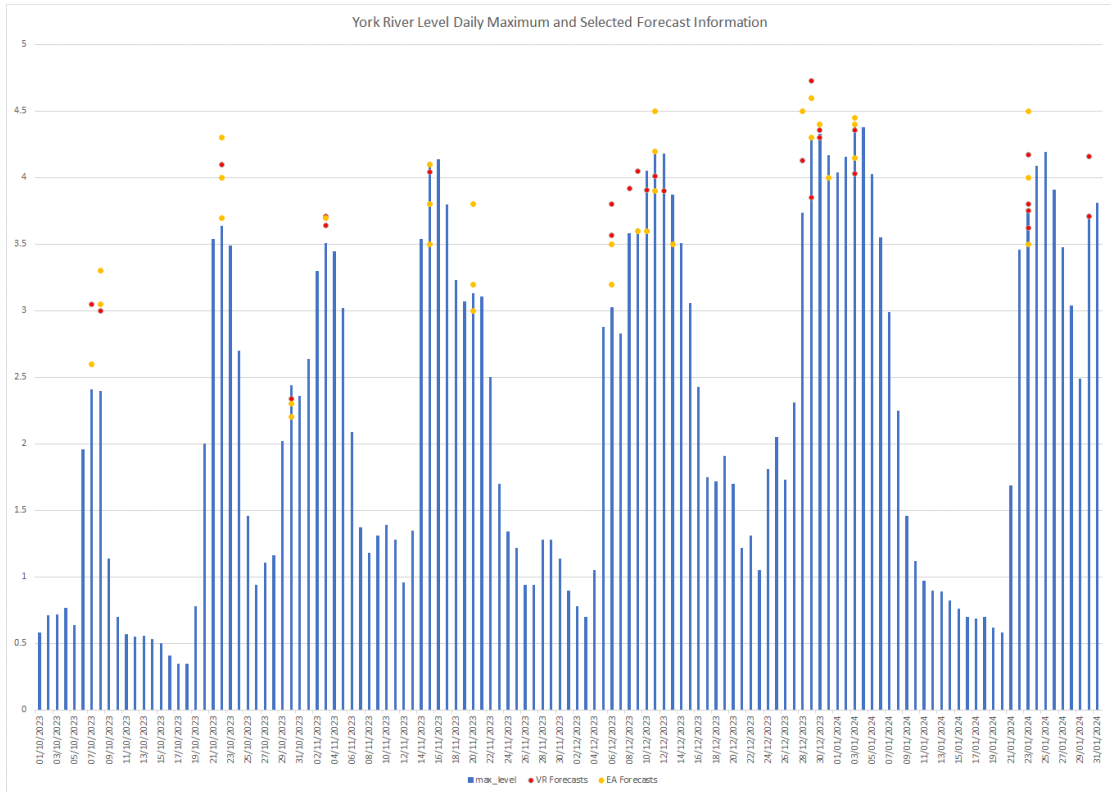


Figure 2 – peak daily Viking Recorder levels October 23 – January 24 and selected forecast information

The forecasts are split between those provided from the Environment Agency in operational meetings and those observed from the Viking Recorder – note that this is only a very small sample of Viking Recorder observations as the forecast trace is prone to regular updates in advance of peak flood levels.

The data is provided to illustrate the varied forecast data that communities and responders must consider. A few observations:

- The October flood peaks were over forecasted, this could result in residents, businesses and responders flood plans being enacted needlessly
- River level impacts following Storm Debi – 13th November – were significantly underestimated with Environment Agency officers stating that they had very little confidence in the raw Viking Recorder forecasts, a range of significantly lower curated forecasts were given as the most likely level
- December flood peaks were underestimated by both the Viking Recorder raw model outputs and the Environment Agency advisory forecasts. The period from the 6th to the 11th December and following

Storm Gerrit 27th to 28th December illustrate this with raw forecasting showing lower levels than the curated forecast levels on numerous occasions

The operational trigger levels and response procedures for the Peckitt Street and Tower Place community are provided in Annex 1.

Operations were first triggered during the period of high river levels in October. Predictions supported the removal of the defences across the city and riverside clean up operations commenced. Flood response actions were triggered again across the city during November.

As referenced above flood forecasting following Storm Debi in mid-November proved to be inaccurate, a delayed deployment of the Peckitt Street Defences understandably caused stress and concern to residents. City of York Council responders relied on the assurances from the Environment Agency expecting flood levels to peak below the threshold of the Peckitt Street floodgates. Levels rose above the predictions.

As further storms were forecasted to require operational response in late November the flood operations at Peckitt Street and Tower Gardens were left in situ, pumps were in place ready for operation as the river level increased triggering their operation.

The flood peaks of the 10th/11th December and the 30th December through to the 4th January were both in excess of 4m at the Viking Recorder (4.19 and 4.4m respectively). The pumps were operated for the earlier peak but were impacted by reliability issues. CYC operatives were able to get the pumps running again but there were periods where the community were understandably concerned experiencing periods where they could not communicate with operatives or discuss the issues with them on the ground. CYC operational response was setup over a 24-hour rota during this time with operatives attending a range of sites and assets across the city to ensure the pumps continued to work effectively and were re-fuelled as required.

The latter peak led to flooding of the gardens/yards of properties in Friars Terrace, unfortunately this also led to floodwater inundation to one property. The community reported that water began pooling

at the bottom of Peckitt Street on the morning of the 29th, property flood resilience pumps further up the street were in operation and it was recognised that this contributed to this and the CYC pumps are essential to draw this down. The pumps were operated in response to this information.

As levels began to rise the community raised concerns that the back-alley pumps on Friars Terrace had not been deployed, operatives ensured the pump was in place. The operation of the back alley pump and the main pump on Peckitt Street relies on the pump hoses being placed where they can have maximum effect drawing down flood water efficiently but there are times when the pooling of water, which understandably causes concern in the community, is not of sufficient depth for the pumps to be operated – pumps cannot be operated in such conditions as they may well pump air which can be damaging to them.

However, despite the continued observations of flood levels by operatives and responses to community requests for pump operation to be considered property flooding did occur. During the response to the highest levels in the back alley CYC operatives did swap out the 3” pump historically deployed at this location for a 4” pump. This did help clear the depth of flood water in the alley and the flooded property but operatives reported that it was more difficult to drain the rear yard of this property due to its decking that prevented effective drawdown of flood water.

Additional pumping had to be provided at Tower Gardens during this time, the operation of the in-situ pumps was also delayed due to suspected vandalism of a brand-new pump hose, this issue was quickly identified and remedied.

Early January saw a period of lower river levels, flood clean up operations commenced and where possible flood operational assets were removed – in some cases, including Peckitt Street, operations were left in-situ to manage access to riverside footpaths until the thick river silts that had built up over the new year period could be removed. A period of freezing temperatures delayed the riverside clean up before Storm Isha hit the UK resulting in predictions that the River Ouse would rise to operational levels at the end of the month.

The Viking Recorder forecasting showed significant variances with Environment Agency forecasts giving a range of possible peak levels between 3.5 and 4.5m at Viking Recorder. CYC operatives worked to the worst case scenario and all operations were deployed. As the flood peak approached the Viking Recorder forecast was amended to 3.8m and Environment Agency colleagues had good confidence in this forecast. Despite the level being lower than potential operational pumping triggers at Peckitt Street CYC operatives observed levels to identify any pumping needs.

Storm Jocelyn immediately followed and peak river levels at the Viking Recorder were predicted to be lower than those following Storm Isha, levels came in higher peaking at 4.2m. Peckitt Street residents were in contact as water began to pool at the bottom of Peckitt Street, pumping commenced when levels allowed and a staff rota was in place throughout the rest of the flood peak, there were periods where the levels did not support pumping but the community understandably were concerned over the ponding of flood water.

The January storms brought further impacts due to significant high winds, trees were brought down in many parts of the city, operational staff had to respond wider than the ongoing flood operations. Concerns were raised over the impacts of felled trees in Tower Gardens and the risk that further tree fall could impact on the integrity of the city wall defences at this location. This was considered within operational response meetings although further responses would have been difficult whilst Tower gardens were in flood.

Although further periods of raised river levels were experienced during February they did not impact significantly and they are not included within this report.

Analysis

Despite the Peckitt Street/Tower Place community being impacted by 4 flood peaks in excess of 4m this winter the resultant levels did not place the existing riverside flood defence at risk of overtopping. However, significant pumping operations had to be carried out across all flood peaks.

Historically CYC initiated pumping behind the Peckitt Street defences to manage the seepage that can occur through the gates, additional pumping in the back alley was added to compliment this.

Due to the engineering complexity of the Kings Staith and Peckitt Street flood cell the EA cannot justify a deliverable and affordable raised flood defence scheme and are offering funded PFR measures for all eligible homes and businesses, this is in addition to the measures that many properties already have in place in the flood cell.

Pumping in the cellars of many properties displaces water onto Peckitt Street adding to the ponding of any seepage of flood water through the gates and wall.

Figure 2 illustrates the way in which the city has suffered from a protracted period of raised river levels this winter as well as rainfall and wind impacts directly on many communities in the city. It is recognised that the Peckitt Street community is impacted by a complex interaction of fluvial, surface and groundwater flooding. Past pumping triggers based on the management of fluvial flood water seepage alone have been challenged in recent years and this winter has further highlighted this. CYC pumping has been required during periods of relatively benign river levels with ponding behind the defences clearly influenced by more than river levels alone.

In contrast to this the presence of ponded water behind the defence is not always enough to ensure that pumping can commence, pumps are deployed at the lowest part of the existing drainage system to ensure they are as efficient as possible and able to draw ponded water levels down effectively. However, without enough depth of water pumping cannot commence, this may lead to some remaining ponding of water and careful observations by the operational teams and the community are needed to trigger the recommencement of pumping.

The inclusion of a 4" pump in the back alley suggests that the pumping rate could be increased but this was during a period of raised standing water in the alley and the pump could reliably draw down this excess water. Any changes to the pumping regime in the

alley may only work if an effective sump could be formed to feed a larger pump.

The community recognise that the Environment Agency forecasts are variable but regularly state that CYC should simply use the Viking Recorder real time level data. Decisions over the initial deployment of operations or the ongoing monitoring for potential pumping triggers cannot simply use real time level information as the operatives involved in flood response in the Peckitt Street/Tower Place community are needed in other parts of the cities flood response, winter maintenance activities or normal operational delivery roles.

A number of breakdowns of pumping apparatus were experienced in Peckitt Street and Tower Place during the winter period, in all cases the operational team resolved the breakdowns or deployed alternative assets to commence operations. The team are prepared for such circumstances but it is appreciated that such issues can be concerning for the community.

Recommendations

- All partners to continue to lobby for Environment Agency forecasting to be improved and online information provides accurate forecasting to support the delivery of homeowners businesses and responder flood plans
- Trigger levels for the deployment of the flood operational measures at Peckitt Street should be reviewed and potentially lowered to take account of the changing flood mechanisms in the community and variable forecast information
- A site meeting should be convened between CYC operatives, the Peckitt Street/Tower Place community and councillors to agree the current pumping needs and recommend any improvements that could be considered to improve the efficiency of operations (feasibility and appraisal work will be needed to justify any available funding for delivery)
- The community, councillors and CYC responders to agree, through the recommended site visit, the trigger points for commencing and pausing pumping to develop a shared understanding of the management of ponded water behind the defence line
- A review of communication channels during a flood event is needed to ensure the community and councillors can reliably contact CYC responders

This review has not considered the wider issue of an increased fluvial standard of protection. The Environment Agency appraisals have identified that the delivery of Property Flood Resilience is the feasible approach to increased flood resilience in the community.

The residents do not feel that the EA PFR assessments fully represent the complex nature of flood risk to their properties – groundwater incursion, multiple surface water flows and entry points and ultimately the overtopping of river side flood resilience measures – and are not supportive of their adoption above and beyond the PFR measures many already have in place.

There are ongoing operational impacts for the council in this community and although the impact of surface and groundwater flooding needs to be managed the significant risk to the community would come from fluvial flooding when the River use is in excess of 4.7m at the Viking Recorder. CYC have previously carried out works to provide more resilience to fluvial flooding, this and the ongoing operational response leave CYC as the only responder in what are predominantly Main River² defences.

CYC do not have the resources to carry out further appraisal of wider solutions in the community, further discussions outside of the operational response review would be needed with the Environment Agency to consider this further.

² Main rivers are usually larger rivers and streams. They are designated as such and are shown on the Main River Map. The Environment Agency carries out maintenance, improvement or construction work on Main Rivers to manage flood risk. Other rivers are called 'ordinary watercourses'. Lead local flood authorities, district councils and internal drainage boards carry out flood risk management work on ordinary watercourses. All Flood Risk Management Authorities (RMA's) have permissive powers to deliver their flood risk management roles.

Annex 1

Peckitt Street and Tower Place Flood Operations Triggers

CYC Highways Emergency Officer Handbook, note that although the need for the Tower Gardens sandbag wall is shown at a higher level it is routinely deployed at the same time as the Peckitt Street defences if forecasts show it will be needed.

Issued at River Ouse Level above normal summer	EA Warning Number	Known Areas Impacted	Action <i>Actions in ITALICS are carried out by EA</i> Actions in BOLD are carried out by CYC <i>Actions in Blue are carried out by YWS</i>
4.80m	720 – River Ouse at York – River Street 721 – River Ouse at York – Peckitt Street	105 Alma Terrace (off New Walk), 4 & 5 South Esplanade affected Peckitt Street and along Clifford Street on the higher ends of Lower Friargate, Cumberland Street and King Street	
4.70m		Salisbury Road affected by seepage through surface	SAFE LIMIT OF DEFENCES AT PECKITT ST. NO ADDITIONAL SANDBAGS TO BE LAID HERE.

<p>4.2m</p>	<p>716 – River Ouse at York – Skeldergate & Tower Street 722 – River Ouse at York – Fulford & Fordlands Road</p>	<p>Peckitt Street, Skeldergate sub station, Rowntree Park, Caravan Park, Lilac House, 4 Cumberland Street, 2 Lower Friargate. New Walk Orchard, Lilac Cottages and Pumping station Cottages affected. Tower Street in danger of flooding through gardens.</p>	<p>A19 AT FULFORD MAY BE AFFECTED, Construct sandbag wall Tower Gardens.</p>
<p>3.96m</p>		<p>Kings Arms flooded to 1st floor windowsill level. Water in the Waterfront restaurant, Cumberland House, 13 to 15 Kings Staith, 1 to 3 Friars Terrace, 8 Peckitt Street and 9 Tower Place. Cellars of Tower Place houses flooded. Water almost flooding Garden Cottage, Grange Garth. Water up to North Street slipway gate & Lendal Arch gate. Footpath/road behind Post Office & Adjacent Scarborough Railway bridge still passable. Terry Avenue near Bonding Warehouse flooded. St Georges Field car park completely flooded. Road flooded at Poppleton and on either side of Naburn. Still passable despite water on York Road, Naburn. Water on road at Bolton Percy</p>	

<p>3.90m</p>	<p>725 – River Ouse at Acaster Malbis</p>	<p>St Georges Field car park, Terry Avenue, New Walk, Blue Bridge Lane, Queens Staith Road, King Street, Friar's Terrace, Tower Place, Lower Friargate, Cumberland Street, 32 Grange Garth & Acaster Lane, Bishopthorpe. Naburn access roads & Naburn Lane no longer passable by buses.</p>	<p><i>Operate Burdyke pumping station</i> <i>Operate sewage pumping stations and Castle Mills pumping station storm outlet. Install temporary pumping at Lendal Tower</i></p>
<p>3.60m</p>		<p>Cinder Lane cycle track commences flooding at low point.</p>	<p><i>Lower Bootham - Marygate roadgate, Earlsborough Terrace gates, Boathouse & canoe club gates operated.</i> Peckitt Street gates & monitor need for pumps.</p>

Commencement of the deployment of the defences at 3.6m as above or, as below, on receipt of flood warning 710:

Flood Warning 710 Defences

Predicted Level & Above	Ward	Action	Start work at River Level	Safe Limit
3.8m	Guildhall	Peckitt Street & Friar's Terrace – Handstops & Pumps	3.6m	4.7m – no more sandbags
3.8m	Guildhall	Tower Place – Stoppers & Sump Pump	3.6m	

Details of our temporary works are provided below:

LOCATION	Temporary Works Number		Forecasted River Level (Viking Recorder above summer level unless otherwise stated)

<p>Peckitt Street, Friar's Terrace and Tower Place</p>	<p>Temwk 13</p>	<ul style="list-style-type: none"> • At Peckitt Street/Friar's Terrace <ul style="list-style-type: none"> ❖ Install handstops in slots at the top of the staircases between South Esplanade and the lower end of Peckitt Street (2No.) ❖ Provide small pump at sump in front of 3 Friar's Terrace, and large pump at gully outside 8 Peckitt Street. • At Tower Place <ul style="list-style-type: none"> ❖ Install 3 No. blanking plates to end crenelation next to No 8 & Arrow Slit & crenelations o/s No 7, (already in situ) ❖ Install 4" pump on Tower Place side of wall <p>After a Risk Assessment post 2012 flooding, defences are NOT to be increased beyond the level for</p>	<p>> 3.8m</p> <p>Start work at 3.6m</p>
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		which they are designed, i.e. 4.7m.	
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