CAPITA SYMONDS

Clarifications on Flood Risk Assessment

Wellesley Aldershot
Grainger Plc

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Prepared By	R J Wills	Signature (File copy only)	
Checked By	K Driscoll	Signature (File copy only)	
Authorised By	K Driscoll	Signature (File copy only)	

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Contents

1 Introduction

The purpose of this report is to supply clarifications to the Environment Agency following the submission of the Flood Risk Assessment supplied in support of the Wellesley Hybrid Planning Application (HPA).

The comments and clarifications are based on a series of questions in original an email from the Environment Agency dated 8th March 2013, which was followed by a meeting between the developer Grainger, Rushmore Borough Council, the Environment Agency and Capita Symonds on 20th March 2013. Following the meeting Capita Symonds Ltd have had numerous discussions and email communications with EA representatives and this report summarises and addresses all the points raised during the series of communications.

The EA email submitted on 8th March together with the minutes of meeting dated 20th March are appended to this document.

The clarifications are required regarding flood risk within and surrounding the proposed development.

2 Executive Summary

A Flood Risk Assessment (FRA) is required for any development to ensure that any potential for flooding of the development and adjoining sites are at no greater risk from flooding than before the proposed development.

The development period for Wellesley is approximately 15 years, hence it is difficult to predict any development principles and changes during that period. As a consequence estimates made on the current Master Plan for the development may be significantly different to the actual development. This in turn introduces variables in design parameters which are likely to change with consequential affects on all elements of the design not least the flood water attenuation.

The requests for clarifications from EA are entirely valid, but some of the answers can only be estimations until such time that the detailed design for all zones is undertaken. For example, if multiple zones enter their detailed design stage at the same time, this could produce a different potential scenario with regard to surface water attenuation than if they were designed at different times.

The FRA for the Wellesley development was reviewed by the Environment Agency (EA), to assess flooding aspects and requested further clarification on elements they considered unclear.

These clarifications are related to the following:

- Flood water attenuation storage for the 1 in 100 + Climate Change event
- Discharge rates for the attenuated water
- Cross zonal flow
- Cross sub-catchment based on the original
- Basingstoke canal failure

2.1 Flood Water Attenuation Storage

In the FRA submission a drawing indicated the approximate storage for each zone and indicated the anticipated nature of the SuDS features that would be used. The EA did not consider the submission gave full evidence that each zone would have the available area for attenuation storage.

We have consequently included in Section 7 of this document, a table which assumes specific types of SuDS features and parameters and explains the typical footprint and where they could be accommodated within the respective zone. We considered that this was the most appropriate way to visualise the capability for storage given the current stage of the development and believe we have demonstrated the capability.

We have also confirmed that we have considered a ‘worst case’ scenario which does not assume any capacity for infiltration to the underlying soils. However, we believe that the final site investigations will demonstrate some capacity for infiltration and as a consequence will affect the final capacity for attenuation storage.

2.2 Discharge Rates for Attenuated Water

We have confirmed that the method of discharging the attenuated water above the 1 in 100 year event will be to release it at 2l/s/ha. The nature of the control mechanism and location of storage will be undertaken during detailed design for each zone.

2.3 Cross Zonal Flow

Due to the uncertain nature and rate of development it was implied that there may be the opportunity to combine attenuation storage between multiple zones. For clarity we have confirmed that all individual zones will need to address all storm attenuation measures within the respective zone. However, should multiple zones be developed at the same time, there may be the opportunity to combine storage attenuation and control arrangements with consequential efficiencies.

2.4 Cross Sub-catchment Flow

The FRA indicated the existing MoD infrastructure and indicative storm water catchment zones based on those networks. The overlay of this information against the new development zones indicated that potentially storm water would not necessarily flow into the same original catchment with potential flooding to other adjoining areas.

We have now confirmed that during the detailed design stage for any future zone, the sub-catchment drainage will be assessed in detail and appropriate design incorporated to either divert a proportional amount of storm water in the historic sub-catchment or make provision for additional storage within the new zone to enable long term slow release storage.

2.5 Basingstoke Canal Failure

The Basingstoke Canal runs along a small part of the northern development boundary and some of the retained MoD land. The concern was for flooding from the canal into the development site from over-topping or embankment failure.

We have been able to confirm that none of the development is below the embankment level of the canal, hence any failure of the embankment would not result in flooding to any part of the development site. In addition there are a number of over-flow points from the canal which prevent the water level within the canal increasing more than approximately 100mm which prevent the canal from over-topping.

3 General Principles of FRA

The Flood Risk Assessment (FRA), described the accepted surface water disposal train and using this is the overarching approach that will be used for the Wellesley development.

The main disposal system will be via a traditional piped network discharging either directly or indirectly to the Basingstoke Canal to the north of the site. The development zones to the west of Queens Avenue, discharge to the canal either through these zones to a direct outfall or will discharge to an ordinary watercourse crossing Farnborough Road to the west and thence on to the canal. The majority of the remaining development zones will discharge to the Basingstoke Canal through the retained MoD land. The exceptions to this are zones P, R & S which discharge to the south of the site.

It will necessary for each of the development zones to discharge at a controlled rate and attenuate as required within the respective boundary of that zone, the surface water from up to and including the 1 in 100 plus 30% climate change storm.

- The intended rate of disposal for all parcels would be the discharge currently derived from the existing development and the extra volume at 2 l/s/ha on each zone`. This will be confirmed for each parcel, zone or phase at detailed design.

- Infiltration will be used wherever possible to reduce the runoff volume once the detailed site investigation has been completed and infiltration tests undertaken in accordance with BRE Digest 365 to determine the suitability for infiltration.

4 Hybrid Planning Application

The Flood Risk Assessment submitted in support of the Wellesley Hybrid Planning Application detailed the proposed method of disposal for surface water for the storm event required. It appears that some of the detail included may have been unclear and we confirm the following:

- The 1 in 100 + 30% CC event will be attenuated within each parcel, zone or phase and the additional volume from that unit will be discharged at 2 l/s/ha.
- A variety of SuDS systems will be utilised to deliver this including, but not limited to, geo-cellular storage, swales, permeable paving, infiltration, lowered car parks and roads for attenuation.
- Geo-cellular crate storage can vary in depth and where steeper slopes in ground level are encountered the system can be increased in depth to reduce footprint.

4.1 Submitted for HPA

The foregoing section lists the intended SuDS features that are likely to be used throughout the development. It was also stated that in general the geo-cellular storage would form the main element for attenuation storage and drawing number CS/050416/UTI/DR/005 included approximations of the total storage that would be require within each development zone.

For the FRA it was decided to give a worst case scenario. For the Maida Zone Phase 1 submission, and the FRA explained that no allowance had been allowed for in the surface water attenuation by utilisation of infiltration. Similarly no allowance has been made for infiltration when estimating the overall storage and attenuation requirements for the wider development.

5 EA Planning Response 8th March 2013

The following addresses and clarifies the points raised in the above.

5.1 Response to Environment Agency 8th March 2013

The following notes are responses to the initial EA Wellesley Hybrid Planning Application reply which also cover the elements discussed in the 20th March meeting.

5.1.1 Demonstration of containment of surface water runoff.

The FRA, stated that the changes in impermeable area, are estimates based on the current Illustrative Master Plan, (IMP). Zone boundaries and main roads are generally fixed, but the internal zone/phase layouts are in outline only and are likely to be subject to considerable change.

The IMP cannot be definitively used to determine changes in impermeable areas. As indicated in Section 6.2.6 of the FRA, using the Maida Zone Phase 1 layout and associated housing density proposals, we have extrapolated that to the other zones to approximate changes in permeable and impermeable areas. This is an imprecise assessment but we believe this was the most appropriate with the information currently available.

This has been demonstrated for Phase 1 and the philosophy will be adopted throughout the development as would be normal for any individual development

5.1.2 Discharge of attenuated Surface Water.

For Phase 1 we have calculated the existing runoff from the site using the current impermeable area together with the potential run off from the developed site based on the current IMP.

The storage has been determined on this assessment together with an increased storage which will facilitate the discharge of attenuated water above the 1 in 100 event at 2 l/s/ha for the remainder of the site. The discharge manhole/s will have a restricted discharge rate through the use of hydrobrakes.

This principle for the discharge of surface water using the 2 l/s/ha for the additional storage will be used for the remainder of the development during the detailed design stages.

5.1.3 Infiltration

Infiltration is a primary element of the SuDS train and it is intended to use this method of disposal wherever possible. The infiltration rates referred to in the FRA are taken from the Entec study undertaken in December 2004. Only eight tests were undertaken for the entire development area which is inadequate for an accurate assessment of infiltration capability. The FRA informs that no allowance has been included for infiltration pending detailed on site analysis in accordance with BRE Digest 365 for infiltration.

5.1.4 Permeable and Impermeable areas.

Until such time that the ratio of impermeable to permeable area is finalised for the entire development, the exact volume and location of attenuation storage cannot be completed.

Section 6.2.8 of the FRA explains the methodology for the estimation of flood storage within each zone based on the estimated changes in impermeability.

Rather than complete an extensive calculation for attenuation for each zone based on imprecise parameters it was decided to make the assessment based on the estimated storage for the entire development.

This storage volume was then apportioned to each of the development zones based on the ratio of the estimated change in impermeable area for each zone.

Drawing CS/050416/UTI/DR/005 indicates some of the locations for attenuation storage. However, the locations indicated were only where we were reasonably confident that the Masterplan was sufficiently developed to make these locations less likely to change.

Following discussions with the EA we have considered that rather than include the estimated footprint for zonal storage on drawing CS/050416/UTI/DR/005, a detailed table would be more descriptive which can be referred back to the drawing. The table is located later in this report.

5.1.5 Flooding in Maida Zone Phase 1

The flooding indicated in this section was based on the assumption that there was still an inflow from the adjoining zones E and D which would be attenuated within those zones during the detailed design for those areas.

We have subsequently removed these contributing flows from the WINDES model to demonstrate this assumption. On the rerun of the model, the loadings from outside Phase 1, entering in sections 7.000 and 1.001, with corresponding areas of 0.527 and 0.711 hectares respectively have been removed. From the calculations, see appendices, it can be seen that all flooding in the 1 in 30 event has been eliminated. In the 1 in 100 + CC surface flooding occurs with a volume of 61m3. This volume will be retained within the site. This will be absorbed primarily by alterations to the geo-cellular storage already proposed. Should infiltration tests prove there is the opportunity for infiltration the geo-cellular storage will be revised as necessary.

As explained previously we have taken the worst case scenario to date with no allowance for infiltration which we would expect to change once the final site investigation has been undertaken.

Drawing CS/050416/UTI/DR/002A has been amended to incorporate the pipe runs not previously indicated.

5.1.6 WINDES Modelling.

Outstanding model information with regard to Maida Zone Phase 1 has been included in the Appendices as requested. This includes results for both the pre and post development scenarios for Maida Zone Phase 1.

5.1.7 Existing surface water drainage sub-catchments.

The existing sub-catchments have been determined from the topographical survey together with the existing surface water drainage system. Because of this the indicated sub-catchments do not relate to simple overland drainage but to a combination of both.

The existing sub-catchments referred to as 20 and 30, discharge to the Basingstoke Canal and the ordinary watercourse respectively and we understand the EA concern of the potential for flooding through cross sub-catchment drainage.

The discharge from a portion of catchment 20 is likely on initial assessment to be incorporated into the ordinary watercourse, which could potentially increase the flood risk to the adjacent area. However, during the detailed design it will be possible for the portion of catchment 20 within the new Coruna Zone to be directed to discharge into the existing catchment 20 with appropriate discharge control.

We have included in the appendices an updated copy of drawing CS/050416/UTI/DR/001A which overlays the existing sub-catchments with the new development zones. In addition we have given a high level assessment in tabular form within this report which cross references the overlaid areas indicating the possible scenarios.

5.1.8 Existing MoD Drainage

The existing pipework running through the MOD retained land which may be utilised as part of the future network is still to be fully investigated to determine its capacity to take the flow from the alienated land development and to determine its condition and suitability for adoption. When this has been completed any changes in pipe sizes or remedial works required will be recorded at that stage.

5.1.9 Cross Zone Attenuation

We confirm that the general principle for the attenuation storage will be independent for each zone. Should multiple zones be developed in coordination with one another the possibility for combined attenuation may be considered during that design exercise.

5.1.10 Discharge from lowered green areas

Any flood water reaching the lowered green areas will discharge through appropriate control structures using silt and debris interception whether discharging to an open water course or a portion of the pipes system.

5.1.11 Basingstoke Canal

To further clarify the potential risks of flooding from the Basingstoke Canal we are able to confirm that all the development zones with the Wellesley site are above the level of any of the canal embankments. The numerous overflows from the canal to the Blackwater river will prevent an overtopping situation and any failure to embankments caused through piping will not cause flooding to the development from the canal.

6 Existing Sub-catchment Zones

The Environment Agency requested that the developer consider the affect of cross sub-catchment water flow within the development.

Early on in the development process Capita Symonds Ltd determined from the topographical and existing surface water drainage system records, an outline catchment zone plan. Although the topographical survey was considered, the main driver for the plan was the existing surface water network catchment.

As a consequence the proposed zoning of the Wellesley development does not coincide with the original sub-catchments which could theoretically affect the drainage of the site. Grainger have accepted this as a possibility and it was agreed that a high level assessment of how the overall drainage may be affected would be drawn up.
The following table gives an overview of the perceived outcome between the existing sub-catchments and the future zoning.

Sub Catchment Reference.	Perceived Affect and Comment
10	The whole sub-catchment is contained within new development zones H, I & J, and the discharge point to the canal is essentially unchanged.
20	Sub-catchment potentially increasing by 0.7 hectares increasing the discharge to the ‘ordinary watercourse’ to the west of Farnborough Road. This could in turn create surface flooding to the remainder of sub-catchment 20. During detailed design this will be addressed to either ascertain that flooding will not occur or design a proportion of the catchment to discharge through sub-catchment 30 to balance the original flow.
30	In association with previous comment. Sub-catchment potentially reducing by 0.7 hectares check and balance of flows to be designed at detail stage.
40	Whole sub-catchment contained within new development zones H, I & J. Discharge point to canal essentially unchanged

Sub Catchment Reference.	Perceived Affect and Comment
110	Sub-catchment mostly contained within new development zones C,D,O & N. Zones M & K are bisected by the boundary. However, the surface water drainage strategy is designed to essentially keep main flows along the lines of the existing strategic routes. This is because the outfall points are fixed through the retained MoD land. Hence the surface water drainage within new development zones M & K separated from sub-catchment 110 will still discharge in the same locations. This approach may require some advance design and installation of strategic network installation in advance of building works.
130	A small portion of new development zone Q currently discharges through this sub-catchment. We see no reason why this discharge situation cannot be retained during development.
140	Wholly outside the new development zones.
150	Wholly within new development zone Q
160	Wholly within new development zone Q
200	Falls within the new zones L, M & K. Discharges through the retained MoD land which should remain unchanged. The detailed design should ensure that the correct proportions from the new zones discharge to the existing sub-catchment. This in fact should make the surface water drainage design simpler.
210	New development zone S sits entirely within the sub-catchment 210.
220	Excluding the areas within the retained MoD land, portions of this sub-catchment will sit within new development zones K & L. The new surface water network can be designed to discharge proportionate quantities into the existing sub-catchment area.
230	Wholly within new development zone Q

7 Approximate Storage Footprints

The following table estimates the footprint for various flood attenuation storage required for the Wellesley development excluding Maida Zone Phase 1 which is detailed within the planning application drawings.

The FRA explains that the volumes estimated can only be confirmed from the final detailed design for each phase of development when the definitive permeable and impermeable areas are known.

7.1 Methodology

Geo-cellular storage will form a major element in the SuDS strategy and as a consequence we believe the most suitable approach for this high level clarification is to base the entire requirement for attenuation storage volume for each phase on geo-cellular storage, along with the other main SuDS strategy of lowered paving, green areas and road sub-base storage. Where these are possible it is recorded within the following table.

If this methodology is considered, it can be proven there is the storage available within each zone, based on the current design parameters available. This confirms that judicious usage of other SuDS features for example, permeable paving, infiltration and swales, then each zone can address the respective flooding issues.

For this evaluation we have assumed that the average depth of geo-cellular crates used would be 2m. We have also simply stated the total volume required and a total footprint. This of course can be broken down in to numerous smaller sections to make up the total footprint. Reference should be made to the Wellesley Illustrative Masterplan (IMP), 5510/HPA/03 rev A, which was included with the Hybrid Planning Application and forms the basis for the permeable/impermeable area estimations.

Hampshire County Council (HCC), have advised that they will not permit the installation of geo-cellular storage under adopted roads, but will accept permeable road construction with attenuation storage forming part of the sub base construction.

Zone Ref & Name	Approx attenuation required m^3	Indicative SuDS features & capacities
B Corunna	4650	The zone is 340m from north to south. Assuming a simple strip of geo-cellular crates 7m wide and 2m deep along this boundary would produce sufficient storage. In addition in this zone there is the opportunity for swales, permeable paving, lowered roads and parking as well as an allowance for infiltration. The IMP indicates there is potentially 2000m of roads available for permeable paving and assuming only a 5m road with a 300mm sub-base with 30% voids available would equate to approximately 900m3 of storage
C CMH	1730	CS/050416/UTI/DR/005 showed an actual location for this storage. This is an area to the back of CMH where a footprint of 150m x 10m is easily available and at the front greater than 40m x 10m. Using only 1m depth of geo-cellular storage would equate to 1800m^3 for this footprint which clearly demonstrates the capacity.
D McGriggor	1390	This zone has a western boundary 190m long. Again a simple strip of geo-cellular along this boundary say 175m x 4m x 2m deep would cover the storage requirement. Additional lowered parking areas and permeable paving more than demonstrate the capacity within the zone.
E. Gunhill	670	This equates to a 26m x 26m square footprint geo-cellular can accommodate the volume at only 1m depth. The IMP and density plan imply significant parking areas which can be lowered in addition and permeable paving and infiltration will also reduce potential footprint.
F. Knollys	460	The IMP indicates small individual development plots along the length of the road. Each unit would require a volume of parking. A standard parking bay has a footprint of 11.5m2 and it would require only 40 bays to accommodate the volume with 1m deep geo-cellular storage.
G. Pennefathers	950	A footprint of 21m x 21m at 2m deep would equate to the volume required. There is parking areas and green space within the zone which far exceed the area required. In addition there is likely to be around 300m plus of roads which can be both permeable and lowered equating to a volume of approximately 320m3. No infiltration has been considered at this time.

Zone Ref & Name	Approx attenuation required m^3	Indicative SuDS features & capacities
H. Stanhope Lines West	2440	The open green space in this zone is approximately 16,750m2. A simple lowering of the surface by 150mm will give 2500m3 of storage. No infiltration has been considered at this time.
I. School End	1670	School End includes both the school and a residential development. The required storage for this zone has not been split between the different development types. However the school has 2 full size playing field in addition to other open space. A simple lowering of only these fields by 150mm would produce in excess 1500m3. No infiltration has been considered at this time.
J. Browning	4040	The IMP for this zone indicates in excess of 800 m of parking spaces each 4.8 m long. This surface area equates to 3840m2 and assuming only a 1m depth of geo-cellular storage requires only another 200m3 which can be more than accommodated within the permeable paving sub base storage. No infiltration has been considered at this time.
K. Stanhope Lines East	2950	As with Stanhope Lines West there is a large open green space. Lowering 75% of the indicated area by only 150mm would produce 1900m3 of storage and an area of geo-cellular storage 33m x 33m and 1 m deep would equate for the remainder of the storage. Again this has not considered road sub-base storage or infiltration.
L. Neighbourhood Centre	660	This equates to a footprint of 26m x 26m with a 1m deep geo-cellular storage. This will be achievable within the revised layout for parking and green spaces. No infiltration has been considered at this time or lowering of any paved surfaces all of which will increase availability of storage.
M. Buller	2950	Almost all of the boundaries of Buller include green areas and the use of swales should be considered. There are likely to be in excess of 1000m of roads suitable for permeable paving accounting for approximately 450m3 of sub-base storage. If say half of this length is lowered to accommodate surface storage a further 300m3 is accounted for. The IMP indicates approximately 300m of car parking areas giving an area of around 1440m3. In addition an area between Buller and the Neighbourhood Centre is an area of parking assigned to the centre roughly 50m x 50m, 2500m2. Geo-cellular and lowered areas more than equate to the required volume. Again no infiltration has been considered at this time.

Zone Ref & Name	Approx attenuation required m^3	Indicative SuDS features & capacities
N. God's Acre incl. School Site	2140	The green areas indicated in Gods Acre and the school fields cover in excess of 17,000m2. A reduction of 150mm over this area would equate to 2550m3. In addition from the IMP there are around 1200m of access road which can be permeable with sub-base storage, lowered for storage as well as other parking areas. No infiltration has been considered at this time.
O. Mandora	1740	Mandora retains a number of existing properties together with new development. The levels of the site would facilitate a simple footprint of 30m x 30m with a 2m depth of geo-cellular storage to cater for this volume. This overall footprint can be located in numerous parts to create the whole within the zone. South of Mandora House could accommodate the Mandora House runoff whilst other areas to the can be accommodated in roads and parking areas on the remainder of the site. Again no infiltration has been considered at this time.
P. Peaked Hill	270	Using a 2m deep a geo-cellular storage would only require a footprint of 135m2, or less than 12m x 12m. This will easily be accommodated within parking areas as well as potential storage within roads both sub-base storage and lowered surfaces.
Q. Clayton	2370	The IMP indicates in excess of 1600m of road suitable for permeable paving or 650m3 of sub-base storage. Indicated parking areas account for a further 2500m2 of area and at 1m deep geo-cellular storage more than covers the required storage. As with the other areas no infiltration has been considered at this time neither has any lowering of paved surfaces.
R. ABRO	1290	A 1m deep geo-cellular storage would require a footprint of 1290m2 or 36m x 36m. The IMP indicates 2 large parking areas together equating to in excess of this surface area. This together with around 250m of roads will adequately address the storage issues

Zone Ref & Name	Approx attenuation required m^3	Indicative SuDS features & capacities
S. Reme	2670	At present Reme is the least developed area which in turn allows the development to be based around a SuDS strategy. The indicated volume of 2670m2 would be fully addressed in a surface area say 6m strip of geo-cellular storage along the northern boundary of the zone. As this is the low side of the zone and discharges in that direction it would be well located here if required. The IMP indicates significant parking areas and roads where the storage could be accommodated progressively through the site to further reduce the rate of discharge from the site. Again no infiltration has been considered at this time.
T. Parsons	450	A 21m x 21m footprint would be required for this at 1m depth of geo-cellular storage. Simple sub-base storage would account for approximately 160m3 of the requirement and geo-cellular under car parking areas would address the remainder. No infiltration has been considered at this time.

8 Appendices

Appendix A **Environment Agency Notes 8th March 2013 and Minutes of Meeting 20th March 2013**

Appendix B **Drawings**

Appendix C **WINDES Calculations**

Appendix A Environment Agency Notes 8th March 2013 and Minutes of Meeting 20th March 2013

Aldershot Urban Extension
Pre-meeting note for Technical Sub-Group Meeting 20th March 2013

The Environment Agency wish to provide the following comments ahead of the Technical Sub-Group meeting on the 20th March. The following comments relate to flood risk only, comments on other aspects of the development will be included in our formal response.

We are pleased to see that it is intended to retain runoff volumes as existing (for canal water resources purposes) but to reduce runoff rates below existing to provide flood risk benefit. We are also pleased to see that it is intended to use a wide range of Sustainable Drainage Systems (SuDS) in a treatment train. However, insufficient information has been submitted for us to be able to confirm that an appropriate surface water drainage scheme is possible at this time. For this reason we require the following information:

Demonstrate that that the increases in runoff volumes up to the 1 in 100 plus climate change storm event are being fully mitigated for in each phase. The proposal involves increasing the amount of impermeable area across the entire site from 41% (existing) to 49% (proposed). This represents a total increase in impermeable area of 13.23ha. As a direct result of this, runoff volumes from the site are expected to increase from 56,530m3 to 82,076 m3 during the 1 in 100 plus climate change storm event. This will increase flood risk elsewhere unless appropriately dealt with. While the application has stated that runoff volume will be not greater than existing, it has not actually been demonstrated that this is possible to achieve

This is a hybrid application with only full planning permission being applied for phase 1 (Zone A –Maida) while the remaining 19 phases (Zones B to T) fall under outline permission. Of these phases, 12 of the proposed will involve an increase in impermeable area including Phase 1; 6 phases will have no change in impermeable area and a further 2 phases will decrease impermeable area. To be acceptable it needs to be demonstrated how the increase in runoff volumes will be managed in each phase.

An increase in volume should be managed by either:

- **Infiltrating the extra runoff volumes.** The remaining discharged volumes can then either be discharged at or below existing rates or infiltrated as well.
- **Discharge all runoff up to the 1 in 100 plus climate change storm event at Greenfield QBAR rates**
- **Discharge existing volumes at no greater than existing rates and discharge the extra volume at 2l/s/ha** in accordance with Preliminary Rainfall Runoff Management Revision E

The preliminary soakage tests submitted indicate that infiltration is not possible along the western boundary of the site and for some of northern boundary. This means that infiltration is unlikely to be possible for phases B, F, G, H, I, J, K, L, and M. The remaining test indicates that slow infiltration may be possible for the remaining phases although further infiltration tests will be required to confirm this.

The summary Table (comparison of estimated existing with projected impermeable area) has provided the attenuation storage required for each phase. The actual discharge rate used to determine this has not been made clear but given the post mitigation discharge rates stated in table 3 of the FRA are less than or equal the existing discharge rates, it appears that none of the above volume mitigation measures are being used. This will result in an increase in flood risk elsewhere.

For these reasons it should be demonstrate that for each of the phases where the impermeable area is increasing:

- How the increase in discharge volumes will be dealt with
- What rate will it be discharged at (this should be in accordance with the methods described above)

- What volume of attenuation storage will be required to achieve this discharge rate (if different from the attenuation storage estimates already provided)
- An indication that there is sufficient space on site to accommodate the attenuation storage provided. Drawing CS/050416/UTI/DR/005 only shows some of the storage needed for some of the phases.
-

For Phase 1 Maida:
Phase 1's impermeable area is increasing by 1.79 ha and the drainage strategy here involves using part infiltration, part attenuation. While we are happy with this methodology, it still needs to be demonstrated that the surface water volumes infiltrated are at least as great as the increase in runoff volumes during the 1 in 100 plus climate change storm event. It should be clear what rate the remaining volumes are being discharged at. If the volumes infiltrated are less than the increase in runoff volumes then the remaining runoff volumes must be discharge using either of the attenuation methods described above.

That any onsite flooding during Phase 1 will be safely retained in the Maida site boundary. The micro drainage calculations submitted indicate that some onsite flooding from the drainage system will occur in phase 1 during the 1 in 30 and the 1 in 100 plus climate change storm event. During the 1 in 30 storm event flooding occurs at pipe E1.006 and E1.007 with flood volumes of 28. 2 m3 and 77.1m3 respectively. During the 1 in 100 plus climate change event flooding occurs at E1.000 (27.2 m3), E1.006 (83.1 m3) and E1.007 (153.7 m3). In both storm events the flood volumes are less than the flood volumes from existing site network.

Existing overland flow from other parts of the wider site flows through this phase flooding parts of Hope Grant's Road, Hospital Road and Queens Avenue. It would appear that flood waters from proposed drainage system will join the existing overland flow.

E1.000 and E1.007 have not been identified on drawing CS/050416/UTI/DR/002. However, E1.000 is assumed to be one of the unlabelled pipes on the southern Maida boundary at the top of the system and E1.007 appears to be located on the northern Maida boundary downstream of the system. The flood waters from E1.000 appear to be directed across Hospital Road and into the permeable paving next to pipe 10.000. It is unclear what happens with the flood waters from E1.007 but this appears to run down Hope Grants Road before leaving Maida site. It is unclear what happens to this runoff once it leaves the phase boundary. **Please confirm where this goes.**

All surface water runoff from phase 1 leaving the phase boundary up to the 1 in 100 plus climate change storm event must be controlled and discharged at the appropriate controlled rates otherwise flood risk elsewhere will be increased. Not only has this not been controlled but by mixing the flood water from the existing overland flow entering the site and that of the flooding from the proposed drainage system will make it difficult to demonstrate that the drainage scheme for phase 1 is fully managing the runoff from phase 1. It would be simpler if these two sources of flood waters were kept separate.

Furthermore it has not been demonstrated that the water flowing along these roads will not pose a hazard to site users in accordance with FD2320/TR2. Please submit this information.

It is also worth highlighting that currently Phase 1 does not comply with the sewer for adoptions requirement of no flooding from the pipe network up to the 1 in 30 storm event. However, the proposals do represent a betterment compared to the existing scenario in terms of flood volumes.

We require the rest of the micro drainage calculations for Phase 1. We currently don't have the results for the smaller pipe networks and infiltration devices. We have only been sent the calculations that relate to pipe series 1.

Demonstrate that changes in how an area drains will not increase runoff draining into individual surface water catchments. This site is complex. There are 20 phases and 13 different surface water sub-catchments. Some of the phases cover parts of several surface water catchments. Majority of these surface water catchments discharge directly into the Basingstoke Canal although some of these sub-catchments (catchments 20 and 30) outfall into an ordinary watercourse east of the site which further downstream joins the Canal. Some of these phases are up slope of retained MOD land. This means that even if the rates and volumes of surface water leaving individual phases are not increased, flood risk can still be increased if a greater proportion of that water drains into a sub-catchment than was the case previously. i.e. sub-catchment size is increased. No information regarding the rates and volumes of surface water discharging from each catchment has been provided. It therefore cannot ascertained what impact the proposal will have on the sub-catchment drainage.

- The ordinary watercourse receives runoff from catchment 20 and 30 is outside of the Wellesley site boundary. It is particularly important that flows to catchment 20 and 30 do not increase as this increased flooding along this watercourse and to 3rd party property and land in its vicinity. Zones A, B, E, F, G, and H have areas draining into catchment 20, while zones G, B, H drain into catchment 30.
- Zones C, D, K, L, M all cover multiple catchments and drain towards retained MOD land. Any increase in sub-catchment sized would potentially overload the MOD drainage system downstream.

- Zones E, F, and T have areas that fall outside of the sub-catchment shown. Presumably these areas don't drain toward to canal but rather towards Aldershot. Again care will need to be taken.

Given the above, please submit the existing runoff rates and volumes for each sub-catchment. It should be clear what proportion is contributed by each development zone. It should be clear that no sub-catchment extra runoff due to the proposals.

- That each Phase will be self-contained or if not that provision will be made to ensure mitigation measure will be in place when needed. Drawing CS/050416/UTI/DR/005 shows green areas that will be lowered for flood storage purposes. These are being provided in Zones H, I, K and N. Presumably floodwater from the other phases will be channelled to these flood storage areas. It looks as if flood water from Phase 1 (Zone A) enters into either the storage areas in H or K? **Please confirm if this is correct**.

Please confirm the following:

- Phases H and K are not due to be built until 2018/2019 and 2020/2021 respectively. Phase 1 (Zone A) is being built 2013/2015. Please confirm that the storage areas will be in place at the same time as Phase 1. If not then flood risk elsewhere will increase as this water leaves phase 1 uncontrolled.

- How will these areas drain once filled with flood waters?
- These storage areas are located in different surface water sub-catchment. This means that they would be receiving surface water from one sub-catchment and potentially discharging into another. As discussed above this can increase flood risk.
- For this reason we would strongly recommend that where possible all the mitigation for a phase are provided in that phase. Mitigation can be provided outside the phase area as long as it is in place at the same time as any phase it is mitigation for. The mitigation outside that phase must ensure that flood risk is not increased either through discharging to a different sub-catchment and must discharge in accordance with the rates agreed for the phase being mitigated.

Provide a back up attenuation scheme where infiltration is proposed. Infiltration has been proposed for parts of the site based on indicative soakage tests. These were widely spaced (some phases did not contain a soakage test). Part of the site proved not to be suitable for infiltration as the infiltration rates were very low. Ground water levels are high in some parts of the site (0.4m below ground level) and so may preclude infiltration in these areas. Please provide a back up attenuation scheme where it is intended to use infiltration, including Phase 1, to ensure that a viable scheme is possible even if infiltration does not prove possible.

We are pleased to see that the over topping of the canal embankment has been assessed and shown to be unlikely given that the embankment closest to the site is higher. However, we understand that the canal is embanked in this section and it is unclear whether failure of the embankment through other mechanisms such as piping is possible. If so it will just need to be clear that the residual risk of failure has been considered.

RUSHMOOR BOROUGH COUNCIL

grainger plc

AUE Technical Group – ENVIRONMENT AGENCY

Notes of meeting held at 10am on 20th March 2013 at RBC Offices

Present:

John Thorne (JT) (Chair)	RBC	Alan Chitson (AC)	Grainger plc
Katharine Makant (KM)	RBC	Jonathan Steele (JS)	Savills
Katie Newton	EA	Marcia McGinty (MM)	R&M
Susie Ellett	EA	Robin Wills (RW)	Capita Symonds

Action

1. **Introduction**

1.1 Introductions took place around the table. The basis for discussion was the pre-meeting note previously circulated by Katie Newton, relating to flood risk. KN confirmed that the EA comments related to both the outline and Phase 1 Maida Zone planning applications.

2. **Mitigation of Increased Run-Off & Infiltration**

2.1 RW confirmed that Grainger intended to retain all the run-off on site and that the rates of discharge would be as existing for the current volume and 2 litres per second per hectare for the extra volume. No assumptions of infiltration had been used in the calculations – this meant there was a 'buffer' of up to 10%. SE was satisfied with this.

2.2 SE referred to the Summary Table: Impermeable Area Estimates (Flood Risk Assessment, page 25, ES Vol 2) which set out the attenuation storage required for each phase. She compared this with Drawing CS/050416/UTI/DR/005 Flood Attenuation and SuDS Proposals (FRA Appendix A Drawings). She required confirmation that there was enough space on site for the storage required. RW noted that the footprint could remain the same while the depth was increased to accommodate volume, particularly where the site sloped. SE asked for this in writing and confirmed that the information could be provided in the form of footprints – she did not require exact locations.

2.3 JS noted that the larger Development Zones (e.g. Coruna) could be developed in phases or development parcels. Prior to commencement of development, a Design Code would be submitted for the overall Development Zone and Reserved Matters Applications would be submitted for each development parcel. Details of drainage provision would be required at both stages. MM noted that Grainger may decide to put in strategic drainage first before selling off the development parcels. SE was satisfied with this.

2.4 It was AGREED that Grainger would provide a revised drawing setting out the worst case attenuation footprint/combined storage capacity for each Development Zone. This should show that there is sufficient space in each development to manage the surface water runoff from that zone and mitigate any increase in runoff volumes. The EA in its formal response would suggest a formal condition requiring details of drainage provision to be provided for each Development Zone and Reserved Matters Application – exact wording to be agreed. — Action: Grainger; EA; JT

3. **Surface Water Sub-Catchments**

3.1 SE tabled a plan which showed the 20 Development Zones overlaid onto the 13 surface water sub-catchments. Some of the Zones covered several sub-catchments – if rates and volumes in individual sub-catchments increased, flood risk could be increased in Aldershot, along the ordinary watercourse west of the site and the retained MOD land. The latter was a particular concern since the MOD drainage system was already under strain.

3.2 In addition, SE asked for confirmation that each Development Zone would be self-contained for flood storage purposes or if not, that mitigation measures outside the Zone would be provided at the same time as it was developed.

3.3 RW confirmed that they had not looked at cross-catchment and offered to provide a high-level assessment, based on existing information, of the likely impact and how this could be mitigated (e.g. hydrobreak capacity and ensuring that the overall sub-catchment area remains the same). SE was satisfied with this. It was AGREED that Grainger would provide the EA with a high-level assessment. Grainger

3.4 JT suggested including a caveat in the conditions with reference to the cross-catchment issue and any subsequent mitigation requirements. SE was satisfied with this. JT

3.5 JS was concerned that the information to be provided may necessitate an Addendum to the Environmental Statement, thereby extending the determination period. Those present agreed that the information to be provided represented clarification, not new information. However, the EIA legislation should be checked. KM to add item to agenda for meeting with AECOM. KM

3.6 KN said that the EA would need to have received the information from Grainger before it could issue a formal response on the planning application. JT agreed that the consultation deadline could be extended. JT

4. **Flooding in Phase 1 Maida Zone**

4.1 SE noted that Grainger's calculations predicted overland flooding (in certain weather conditions) of the three main roads around the Maida Zone – Hope Grants' Road, Hospital Road and Queen's Avenue. The predicted flood volumes were less than the volumes from the existing site network. However, access to dwellings in the Maida Zone may become difficult and she wanted an assurance that the hazard risks had been assessed. Grainger to provide. Grainger

Existing flood waters from the other development zones was getting into the proposed drainage for Phase 1. As the phase 1 already floods in the 1 in 30, it is not possible to determine if the proposed drainage scheme floods because of the overland flow getting into the system or due to the system being undersized. RW was to submit calculations showing that the drainage for phase 1 has been suitably sized to cope with the runoff from phase 1. Grainger to provide.

4.2 SE noted that some of the pipes had not been identified in Drawing CS/050416/UTI/DR/002 and requested an amended drawing. Grainger to provide. Grainger

4.3 SE noted that micro drainage calculations for the smaller pipe networks had not been submitted. Grainger to provide. Grainger

4.4 SE emphasised the need for the Council to consider whether it was happy with floodwater being routed down the main roads. She noted that attenuation would not happen until a later date – development of Zones E and D. RBC

5. **Canal Embankment**

5.1 SE noted that, as the canal embankment was higher on the AUE side, over topping was unlikely. However, she wanted an assurance that the residual risk of failure through other mechanisms e.g. piping, had been considered. Grainger to provide. Grainger

6. **HCC Queries on Zone I – School End**

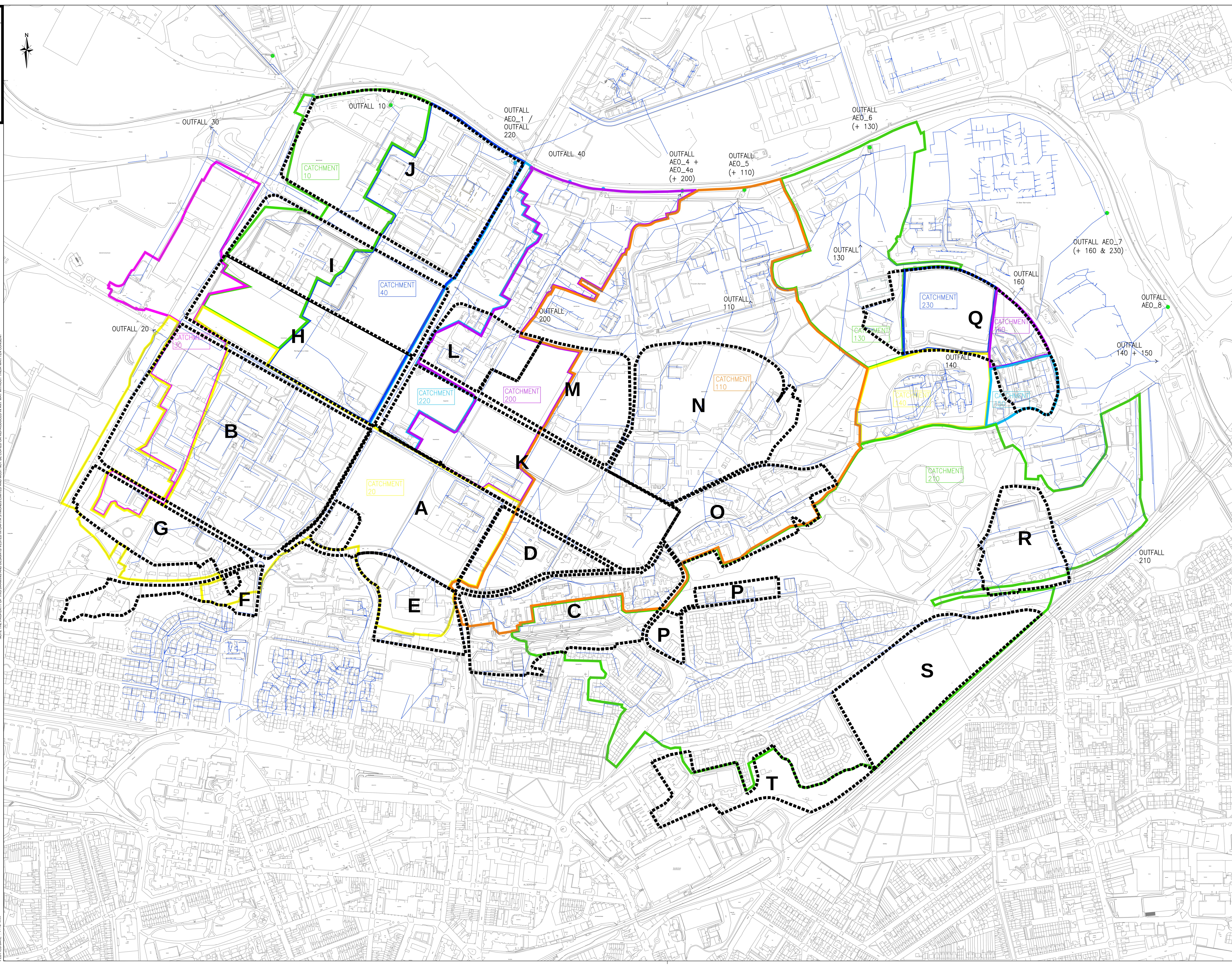
6.1 Initial questions from Colin Pocock of HCC Education on surface water drainage for Zone I – School End had been previously circulated.

6.2 MM queried whether under Regulation 3, HCC were bound by RBC conditions. JT replied that, whilst this was a grey area, the reality was that they would be bound politically to comply.

7. **Next Steps**

7.1	KM to circulate note of meeting.	KM
7.2	Grainger to provide clarification and amended drawings as agreed, by 29th March. SE and RW to liaise to ensure submission meets EA requirements.	Grainger SE/RW
7.3	Environment Agency to issue interim response to consultation acknowledging meeting , by 29th March.	EA
7.4	Environment Agency to issue formal response to planning application response by mid April.	EA

Appendix B Drawings



NOTES

1. RED LINE PLANNING BOUNDARY OMITTED FOR CLARITY

KEY

SURFACE WATER DRAINAGE PIPES

PROPOSED DEVELOPMENT ZONE

REV		DE	DR	CH	PA	DATE
A	ADDED DEVELOPMENT ZONE BOUNDARIES	FN	FN	RJW	KRD	04.13

DESIGNED BY	DRAWN BY	CHECKED BY	PASSED BY
BF	SW	BDF	RJW
DATE 11.11	DATE 11.11	DATE 12.12	DATE 12.12

SCALES @ A0 SIZE: 1:2,500

ISSUE STATUS: PLANNING ISSUE

WELLESLEY
ALDERSHOT

EXISTING
SURFACE WATER
DRAINAGE CATCHMENTS
AND DEVELOPMENT ZONES

GRAINGER PLC

CAPITA SYMONDS

Capita Symonds House, Wood Street,
East Grinstead, West Sussex RH19 1UU
Tel: +44 (0)1342 327161 Fax: +44 (0)1342 315927

DRAWING NUMBER: CS/050416/UTI/DR/001 REV. A

DRAWING NUMBER CS/050416/UTI/DR/001 REV A

NOTES

1. LAYOUT TAKEN FROM ADAM URBANISM DRAWING 5510/HPAxx.
2. SURFACE WATER NETWORK AND ATTENUATION LOCATIONS ARE INDICATIVE. FINAL SIZING AND LOCATIONS ARE SUBJECT TO DETAILED DESIGN.
3. USEAGE OF EXISTING SURFACE WATER NETWORK WILL DEPEND ON RESULTS FROM FINAL CCTV SURVEY.
4. SURFACE WATER NETWORK TO BE DESIGNED IN ACCORDANCE WITH SEWERS FOR ADOPTION AND TO ATTENUATE FOR THE 1 IN 100 YEAR STORM PLUS 30% CLIMATE CHANGE.
5. EXISTING CATCHMENTS TO THE SOUTH AND EAST HAVE BEEN USED IN ASSESSING THE EXISTING SURFACE WATER SEWERS IN LINE WITH "SEWERS FOR ADOPTION". ANY FLOODING FROM THESE CATCHMENTS HAS NOT BEEN ACCOUNTED FOR WITHIN THE PHASE 1 ATTENUATION AS THESE WILL BE CATERED FOR SEPARATELY.
6. FLOOD FLOWS FROM CATCHMENTS TO THE SOUTH AND EAST WILL FOLLOW THE EXISTING FLOOD PATHS AND BE MAINTAINED WITHIN KERBED HIGHWAY.

KEY

- ROOFED AREAS
- PROPOSED HIGHWAYS/ CYCLEWAY/FOOTWAY
- PROPOSED PERMEABLE AREAS
- EXISTING HIGHWAYS
- PROPOSED CELLULAR ATTENUATION
- PROPOSED PERMEABLE PAVING
- GARASTOR MANHOLE (DISCHARGE RATE 1.4L/S)
- SURFACE WATER MANHOLE
- SURFACE WATER CONTROL MANHOLE
- SURFACE WATER PIPE
- REDUNDANT SURFACE WATER PIPE
- EXISTING SURFACE WATER PIPE
- OVERLAND FLOOD FLOWS FROM EXISTING DEVELOPED AREAS
- MAIDA ZONE PHASE 1 BOUNDARY

REV		DE	DR	CH	PA	DATE
A	ADDED PIPE REFERENCES	FN	FN	RJW	KRD	03.13

DESIGNED BY	DRAWN BY	CHECKED BY	PASSED BY
GD	GD	BDF	RJW
DATE 12.12	DATE 12.12	DATE 12.12	DATE 12.12

SCALES @ A1 SIZE: 1:500
ISSUE STATUS: PLANNING ISSUE

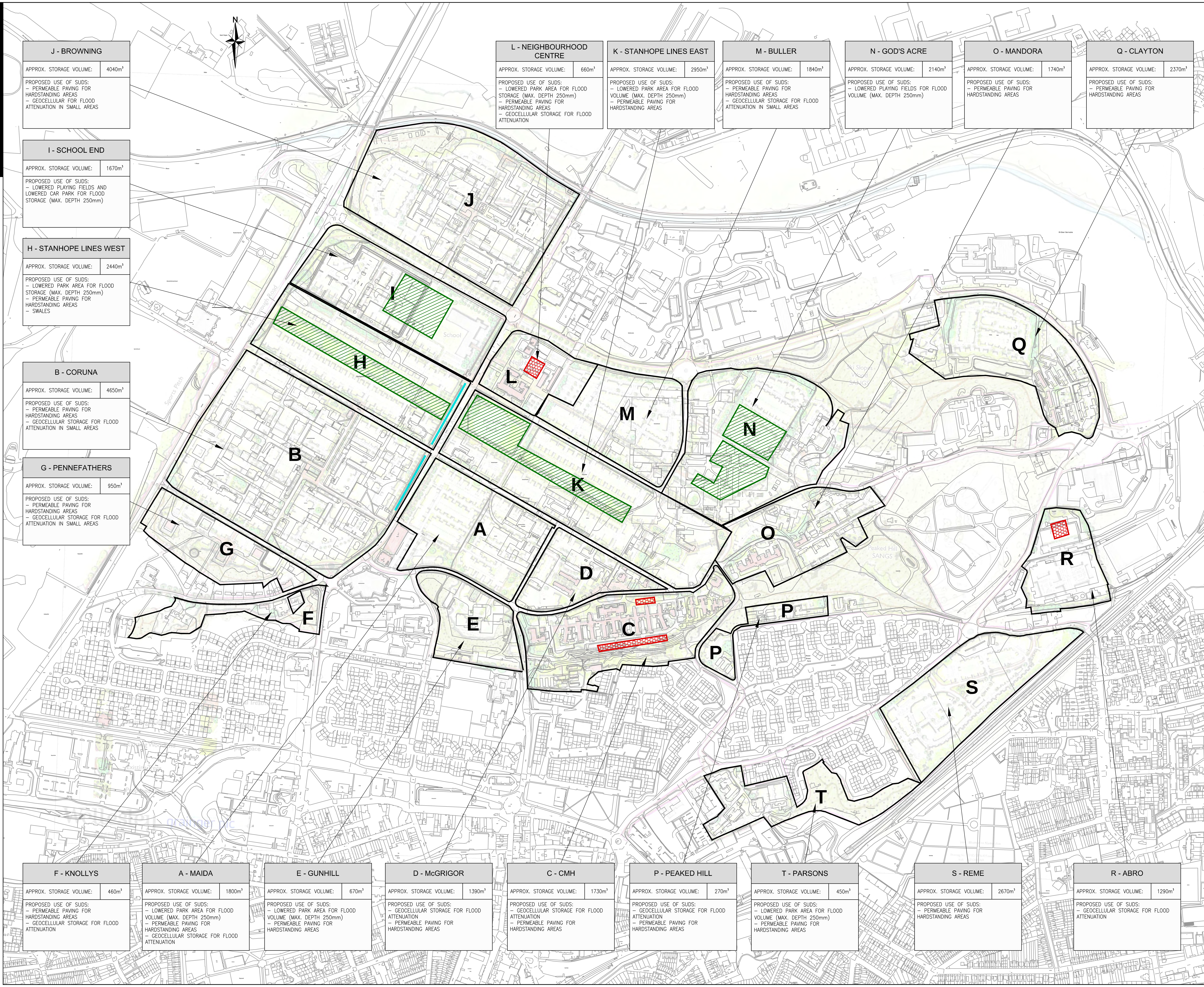
WELLESLEY ALDERSHOT

MAIDA PHASE 1 SURFACE WATER DRAINAGE STRATEGY

GRAINGER PLC

CAPITA SYMONDS
Capita Symonds House, Wood Street,
East Grinstead, West Sussex RH19 1UU
Tel: +44 (0)1342 327161 Fax: +44 (0)1342 315927

DRAWING NUMBER: CS/050416/UTI/DR/002
REV.: A



NOTES

KEY

SWALES

LOWERED GREEN AREAS FOR FLOOD STORAGE

GEOCELLULAR CRATES

NOTES

1. FOR MAIDA PHASE 1 DETAILS SEE DRAWING CS/050416/UTI/DR/002
2. ALL POSITIONS ARE INDICATIVE ONLY AND NOT TO SCALE.
3. EXACT LOCATIONS, SIZE AND TYPE OF SUDS FEATURE WILL BE DETERMINED AT DETAILED DESIGN FOR EACH PHASE.
4. RESULTS FROM SITE INVESTIGATION WILL DETERMINE INFILTRATION CAPABILITY IN EACH PHASE.
5. GEOCELLULAR STORAGE WILL BE CONSIDERED FOR ALL SITES WHEREVER APPROPRIATE

REV		DE	DR	CH	PA	DATE

DESIGNED BY	DRAWN BY	CHECKED BY	PASSED BY
FN	FN	BDF	RJW
DATE 12.12	DATE 12.12	DATE 12.12	DATE 12.12

SCALES @ A1 SIZE	ISSUE STATUS
NTS	PRELIMINARY

WELLESLEY
ALDERSHOT

FLOOD ATTENUATION
AND SUDS
PROPOSALS
INDICATIVE ONLY

GRAINGER PLC

CAPITA SYMONDS
Capita Symonds House, Wood Street,
East Grinstead, West Sussex RH19 1UU
Tel: +44 (0)1342 327161 Fax: +44 (0)1342 315927

DRAWING NUMBER CS/050416/UTI/DR/005 REV. -

REV. -
DRAWING NUMBER CS/050416/UTI/DR/005

-10mm 0 10mm

CAD FILE NAME : \\CSLGRVMU01\DATA\ZENV\PROJECTS\CS050416 AUE_ALDERSHOT\B WORK_TASKS\6_ZINK - UTILITIES\DESIGN\CAD\CS-050416-UTI-DR-005.DWG
CTB FILE NAME : ZDTI.ctb
PLOTTED DATE : 06-Dec-2012

Appendix C WINDES Calculations

Time Area Diagram for Existing

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	3.269	4-8	7.916	8-12	1.953

Total Area Contributing (ha) = 13.139

Total Pipe Volume (m^3) = 492.429

Existing Network Details for Existing

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
E1.000	21.386	1.120	19.1	0.143	4.00	0.0	0.600	o	152
E1.001	54.472	2.785	19.6	0.088	0.00	0.0	0.600	o	152
E1.002	95.477	2.225	42.9	0.296	0.00	0.0	0.600	o	229
E1.003	78.353	0.990	79.1	0.000	0.00	0.0	0.600	o	305
E1.004	76.604	2.844	26.9	0.979	0.00	0.0	0.600	o	381
E2.000	19.637	0.149	131.8	0.066	4.00	0.0	0.600	o	152
E2.001	12.202	0.092	132.6	0.000	0.00	0.0	0.600	o	152
E2.002	47.662	1.454	32.8	0.040	0.00	0.0	0.600	o	152
E2.003	63.985	1.682	38.0	0.216	0.00	0.0	0.600	o	152
E3.000	35.929	0.380	94.6	0.003	4.00	0.0	0.600	o	152
E4.000	61.523	1.570	39.2	0.150	4.00	0.0	0.600	o	152
E5.000	25.155	0.700	35.9	0.066	4.00	0.0	0.600	o	152
E3.001	82.931	1.697	48.9	0.007	0.00	0.0	0.600	o	229

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Vel (m/s)	Cap (l/s)
E1.000	106.480	0.143	0.0	2.34	42.4
E1.001	105.360	0.231	0.0	2.31	41.9
E1.002	102.498	0.527	0.0	2.03	83.4
E1.003	100.197	0.527	0.0	1.79	130.6
E1.004	99.207	1.506	0.0	3.54	403.4
E2.000	109.210	0.066	0.0	0.88	16.0
E2.001	109.061	0.066	0.0	0.88	15.9
E2.002	108.969	0.106	0.0	1.78	32.3
E2.003	107.515	0.322	0.0	1.65	30.0
E3.000	107.910	0.003	0.0	1.04	18.9
E4.000	109.100	0.150	0.0	1.63	29.5
E5.000	108.230	0.066	0.0	1.70	30.8
E3.001	107.451	0.226	0.0	1.90	78.1

Existing Network Details for Existing

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
E6.000	31.590	1.145	27.6	0.050	4.00	0.0	0.600	o	152
E2.004	27.236	0.944	28.9	0.000	0.00	0.0	0.600	o	227
E7.000	19.034	0.687	27.7	0.014	4.00	0.0	0.600	o	152
E7.001	21.077	0.574	36.7	0.000	0.00	0.0	0.600	o	305
E8.000	19.925	0.630	31.6	0.033	4.00	0.0	0.600	o	152
E8.001	44.682	0.660	67.7	0.060	0.00	0.0	0.600	o	152
E8.002	27.892	0.211	132.2	0.000	0.00	0.0	0.600	o	152
E2.005	91.169	4.051	22.5	0.000	0.00	0.0	0.600	o	305
E2.006	30.865	1.397	22.1	0.335	0.00	0.0	0.600	o	305
E2.007	29.802	1.349	22.1	0.000	0.00	0.0	0.600	o	305
E2.008	8.199	0.371	22.1	0.000	0.00	0.0	0.600	o	305
E2.009	29.707	0.845	35.2	0.000	0.00	0.0	0.600	o	305
E2.010	6.227	0.284	21.9	0.000	0.00	0.0	0.600	o	305

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Vel (m/s)	Cap (l/s)
E6.000	106.980	0.050	0.0	1.94	35.2
E2.004	105.758	0.598	0.0	2.46	99.5
E7.000	106.150	0.014	0.0	1.94	35.1
E7.001	105.310	0.014	0.0	2.63	192.2
E8.000	106.390	0.033	0.0	1.81	32.9
E8.001	105.760	0.093	0.0	1.23	22.4
E8.002	105.100	0.093	0.0	0.88	16.0
E2.005	104.736	0.705	0.0	3.36	245.8
E2.006	100.685	1.040	0.0	3.39	248.0
E2.007	99.288	1.040	0.0	3.40	248.0
E2.008	97.939	1.040	0.0	3.39	248.0
E2.009	97.568	1.040	0.0	2.69	196.4
E2.010	96.723	1.040	0.0	3.41	249.0

Existing Network Details for Existing

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
E1.005	74.694	0.629	118.8	0.133	0.00	0.0	0.600	o	381
E1.006	81.335	2.029	40.1	0.191	0.00	0.0	0.600	o	381
E9.000	53.393	1.993	26.8	0.169	4.00	0.0	0.600	o	229
E9.001	16.546	0.617	26.8	0.000	0.00	0.0	0.600	o	229
E9.002	24.424	0.360	67.8	0.066	0.00	0.0	0.600	o	229
E9.003	64.801	2.190	29.6	0.044	0.00	0.0	0.600	o	229
E9.004	36.417	0.290	125.6	0.000	0.00	0.0	0.600	o	229
E9.005	19.702	0.946	20.8	0.000	0.00	0.0	0.600	o	229
E9.006	30.262	0.456	66.4	0.000	0.00	0.0	0.600	o	229
E10.000	44.918	0.916	49.0	0.218	4.00	0.0	0.600	o	229
E9.007	189.715	6.902	27.5	0.756	0.00	0.0	0.600	o	305
E1.007	50.942	1.460	34.9	0.050	0.00	0.0	0.600	o	381
E1.008	50.942	1.050	48.5	0.050	0.00	0.0	0.600	o	381

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Vel (m/s)	Cap (l/s)
E1.005	96.363	2.679	0.0	1.68	191.4
E1.006	95.734	2.870	0.0	2.90	330.4
E9.000	107.390	0.169	0.0	2.57	105.7
E9.001	105.397	0.169	0.0	2.57	105.7
E9.002	104.780	0.235	0.0	1.61	66.2
E9.003	104.420	0.279	0.0	2.44	100.6
E9.004	102.230	0.279	0.0	1.18	48.5
E9.005	101.940	0.279	0.0	2.91	120.0
E9.006	100.994	0.279	0.0	1.63	67.0
E10.000	101.530	0.218	0.0	1.89	78.0
E9.007	100.538	1.253	0.0	3.04	222.3
E1.007	93.560	4.173	0.0	3.11	354.3
E1.008	92.100	4.223	0.0	2.63	300.2

Existing Network Details for Existing

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
E1.009	75.733	1.480	51.2	0.368	0.00	0.0	0.600	o	610
E1.010	52.218	0.750	69.6	0.072	0.00	0.0	0.600	o	610
E1.011	83.074	0.260	319.5	0.072	0.00	0.0	0.600	o	610
E11.000	13.730	0.510	26.9	0.025	4.00	0.0	0.600	o	102
E11.001	34.102	1.430	23.8	0.116	0.00	0.0	0.600	o	102
E11.002	16.478	0.810	20.3	0.009	0.00	0.0	0.600	o	102
E11.003	41.949	0.480	87.4	0.037	0.00	0.0	0.600	o	152
E11.004	10.707	0.123	87.0	0.000	0.00	0.0	0.600	o	229
E11.005	12.572	1.170	10.7	0.129	0.00	0.0	0.600	o	229
E12.000	16.513	0.125	132.1	0.023	4.00	0.0	0.600	o	102
E12.001	88.124	2.575	34.2	0.000	0.00	0.0	0.600	o	152
E12.002	29.459	0.490	60.1	0.176	0.00	0.0	0.600	o	152
E12.003	60.963	0.960	63.5	0.000	0.00	0.0	0.600	o	229
E11.006	61.683	3.230	19.1	0.000	0.00	0.0	0.600	o	305
E11.007	22.340	0.460	48.6	0.223	0.00	0.0	0.600	o	305

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Vel (m/s)	Cap (l/s)
E1.009	91.050	4.591	0.0	3.45	1006.8
E1.010	89.420	4.663	0.0	2.95	862.6
E1.011	88.670	4.735	0.0	1.37	400.7
E11.000	106.100	0.025	0.0	1.51	12.4
E11.001	105.590	0.141	0.0	1.61	13.1
E11.002	104.160	0.150	0.0	1.74	14.2
E11.003	103.350	0.187	0.0	1.09	19.7
E11.004	102.793	0.187	0.0	1.42	58.4
E11.005	102.670	0.316	0.0	4.06	167.2
E12.000	105.650	0.023	0.0	0.68	5.5
E12.001	105.525	0.023	0.0	1.74	31.6
E12.002	102.950	0.199	0.0	1.31	23.8
E12.003	102.460	0.199	0.0	1.66	68.5
E11.006	101.500	0.515	0.0	3.65	266.9
E11.007	98.270	0.738	0.0	2.29	167.0

Existing Network Details for Existing

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
E11.008	74.969	1.434	52.3	0.054	0.00	0.0	0.600	o	381
E11.009	19.796	0.161	123.0	0.000	0.00	0.0	0.600	o	610
E11.010	37.906	0.810	46.8	0.054	0.00	0.0	0.600	o	610
E13.000	26.063	0.932	28.0	0.000	4.00	0.0	0.600	o	229
E13.001	25.234	1.030	24.5	0.091	0.00	0.0	0.600	o	229
E13.002	59.920	1.708	35.1	0.148	0.00	0.0	0.600	o	229
E13.003	77.784	1.720	45.2	0.229	0.00	0.0	0.600	o	305
E13.004	29.247	0.200	146.2	0.461	0.00	0.0	0.600	o	305
E13.005	26.283	1.495	17.6	0.068	0.00	0.0	0.600	o	305
E11.011	37.930	0.400	94.8	0.496	0.00	0.0	0.600	o	610
E11.012	58.768	1.410	41.7	0.235	0.00	0.0	0.600	o	610
E11.013	34.677	1.440	24.1	0.680	0.00	0.0	0.600	o	610
E11.014	29.088	1.390	20.9	0.197	0.00	0.0	0.600	o	610
E11.015	25.993	1.060	24.5	0.187	0.00	0.0	0.600	o	610
E11.016	124.161	0.830	149.6	0.000	0.00	0.0	0.600	o	610
E11.017	3.804	0.160	23.8	0.000	0.00	0.0	0.600	o	610

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Vel (m/s)	Cap (l/s)
E11.008	97.734	0.792	0.0	2.54	289.1
E11.009	96.071	0.792	0.0	2.22	648.2
E11.010	95.910	0.846	0.0	3.60	1053.0
E13.000	102.490	0.000	0.0	2.51	103.5
E13.001	101.558	0.091	0.0	2.68	110.6
E13.002	100.528	0.239	0.0	2.24	92.3
E13.003	98.820	0.468	0.0	2.37	173.1
E13.004	97.100	0.929	0.0	1.31	95.8
E13.005	96.900	0.997	0.0	3.81	278.2
E11.011	95.100	2.339	0.0	2.53	738.6
E11.012	94.700	2.574	0.0	3.82	1116.0
E11.013	93.290	3.254	0.0	5.03	1469.4
E11.014	91.850	3.451	0.0	5.39	1576.5
E11.015	90.460	3.638	0.0	4.98	1456.1
E11.016	89.400	3.638	0.0	2.01	587.3
E11.017	88.570	3.638	0.0	5.06	1478.8

Existing Network Details for Existing

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
E1.012	30.719	0.148	207.6	0.135	0.00	0.0	0.600	o	762
E14.000	27.861	0.830	33.6	0.177	4.00	0.0	0.600	o	229
E14.001	19.638	0.130	151.1	0.354	0.00	0.0	0.600	o	305
E14.002	13.507	1.114	12.1	0.000	0.00	0.0	0.600	o	305
E14.003	47.200	0.710	66.5	0.155	0.00	0.0	0.600	o	305
E14.004	26.692	1.000	26.7	0.000	0.00	0.0	0.600	o	305
E14.005	38.777	1.210	32.0	0.000	0.00	0.0	0.600	o	305
E14.006	38.407	1.420	27.0	0.033	0.00	0.0	0.600	o	305
E15.000	34.359	1.300	26.4	0.271	4.00	0.0	0.600	o	229
E15.001	44.653	1.660	26.9	0.193	0.00	0.0	0.600	o	229
E15.002	28.420	1.240	22.9	0.000	0.00	0.0	0.600	o	229
E15.003	42.599	0.940	45.3	0.000	0.00	0.0	0.600	o	229
E15.004	63.163	2.200	28.7	0.000	0.00	0.0	0.600	o	229
E15.005	28.566	1.190	24.0	0.083	0.00	0.0	0.600	o	305

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Vel (m/s)	Cap (l/s)
E1.012	88.258	8.508	0.0	1.96	892.9
E14.000	98.380	0.177	0.0	2.29	94.4
E14.001	97.474	0.531	0.0	1.29	94.3
E14.002	97.344	0.531	0.0	4.59	335.2
E14.003	96.230	0.686	0.0	1.95	142.6
E14.004	95.520	0.686	0.0	3.09	225.6
E14.005	94.520	0.686	0.0	2.82	205.8
E14.006	93.310	0.719	0.0	3.07	224.1
E15.000	100.420	0.271	0.0	2.58	106.4
E15.001	99.120	0.464	0.0	2.56	105.5
E15.002	97.460	0.464	0.0	2.78	114.3
E15.003	96.220	0.464	0.0	1.97	81.2
E15.004	95.280	0.464	0.0	2.48	102.1
E15.005	93.080	0.547	0.0	3.26	237.9

Existing Network Details for Existing

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
E14.007	14.686	0.424	34.6	0.000	0.00	0.0	0.600	o	305
E14.008	31.647	0.250	126.6	0.172	0.00	0.0	0.600	o	381
E14.009	63.992	1.300	49.2	0.000	0.00	0.0	0.600	o	381
E14.010	2.385	0.041	58.2	0.269	0.00	0.0	0.600	o	381
E14.011	25.353	0.357	71.0	0.000	0.00	0.0	0.600	o	381
E14.012	55.293	0.951	58.1	1.760	0.00	0.0	0.600	o	457
E1.013	123.688	1.880	65.8	0.081	0.00	0.0	0.600	o	762
E1.014	50.533	0.549	92.0	0.031	0.00	0.0	0.600	o	762
E16.000	21.518	0.965	22.3	0.005	4.00	0.0	0.600	o	305
E16.001	25.931	0.710	36.5	0.000	0.00	0.0	0.600	o	305
E16.002	50.769	1.602	31.7	1.047	0.00	0.0	0.600	o	458
E16.003	17.716	0.500	35.4	0.000	0.00	0.0	0.600	o	458
E16.004	13.150	1.609	8.2	0.000	0.00	0.0	0.600	o	458
E1.015	29.544	0.320	92.3	0.000	0.00	0.0	0.600	o	762

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Vel (m/s)	Cap (l/s)
E14.007	91.890	1.266	0.0	2.71	197.9
E14.008	91.390	1.438	0.0	1.63	185.3
E14.009	91.140	1.438	0.0	2.61	298.0
E14.010	89.840	1.707	0.0	2.40	274.0
E14.011	89.799	1.707	0.0	2.17	247.9
E14.012	89.366	3.467	0.0	2.70	442.3
E1.013	88.110	12.056	0.0	3.49	1590.5
E1.014	86.230	12.087	0.0	2.95	1343.7
E16.000	91.520	0.005	0.0	3.38	246.9
E16.001	90.555	0.005	0.0	2.64	192.7
E16.002	89.692	1.052	0.0	3.66	603.3
E16.003	88.090	1.052	0.0	3.46	570.4
E16.004	87.590	1.052	0.0	7.22	1190.1
E1.015	85.681	13.139	0.0	2.94	1341.7

Existing Network Details for Existing

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
E17.000	89.884	2.410	37.3	0.000	4.00	0.0	0.600	o	152
E17.001	18.981	2.159	8.8	0.000	0.00	0.0	0.600	o	533
E1.016	8.284	0.091	91.0	0.000	0.00	0.0	0.600	o	762

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Vel (m/s)	Cap (l/s)
E17.000	90.530	0.000	0.0	1.67	30.3
E17.001	87.737	0.000	0.0	7.66	1708.6
E1.016	85.361	13.139	0.0	2.96	1351.2

Simulation Criteria for Existing

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	1
Site Location	487000 152100 SU 87000 52100
C (1km)	-0.025
D1 (1km)	0.301
D2 (1km)	0.275
D3 (1km)	0.307
E (1km)	0.300
F (1km)	2.648
Summer Storms	Yes
Winter Storms	No
Cv (Summer)	0.750

Synthetic Rainfall Details

Cv (Winter)	0.840
Storm Duration (mins)	30

Summary of Critical Results by Maximum Level (Rank 1) for Existing

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 2
Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
E1.000	15 Summer	2	0%					
E1.001	15 Winter	2	0%	2/15 Summer				
E1.002	15 Winter	2	0%	2/15 Summer				
E1.003	15 Winter	2	0%					
E1.004	15 Winter	2	0%	2/15 Summer				
E2.000	15 Winter	2	0%					
E2.001	15 Winter	2	0%					
E2.002	15 Winter	2	0%	2/15 Winter				
E2.003	15 Winter	2	0%	2/15 Summer				
E3.000	15 Winter	2	0%					
E4.000	15 Winter	2	0%	2/15 Summer				
E5.000	15 Winter	2	0%					
E3.001	15 Winter	2	0%					
E6.000	15 Winter	2	0%					
E2.004	15 Winter	2	0%					
E7.000	15 Winter	2	0%					
E7.001	15 Summer	2	0%					
E8.000	15 Winter	2	0%					
E8.001	15 Winter	2	0%					
E8.002	15 Winter	2	0%	2/15 Summer				
E2.005	15 Winter	2	0%					
E2.006	15 Winter	2	0%	2/15 Winter				
E2.007	15 Winter	2	0%	2/15 Summer				
E2.008	15 Winter	2	0%	2/15 Summer				
E2.009	15 Winter	2	0%	2/15 Summer				
E2.010	15 Winter	2	0%	2/15 Summer				
E1.005	15 Winter	2	0%	2/15 Summer				
E1.006	15 Winter	2	0%	2/15 Summer	2/15 Summer			3
E9.000	15 Winter	2	0%					
E9.001	15 Winter	2	0%					
E9.002	15 Winter	2	0%					

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
E9.003	15 Winter	2	0%					
E9.004	15 Winter	2	0%	2/15 Summer				
E9.005	15 Winter	2	0%					
E9.006	15 Winter	2	0%	2/15 Winter				
E10.000	15 Winter	2	0%					
E9.007	15 Winter	2	0%	2/15 Winter				
E1.007	15 Winter	2	0%	2/15 Summer	2/15 Summer			5
E1.008	15 Winter	2	0%	2/15 Summer				
E1.009	15 Winter	2	0%					
E1.010	15 Winter	2	0%					
E1.011	15 Winter	2	0%	2/15 Summer				
E11.000	15 Winter	2	0%	2/15 Summer				
E11.001	15 Winter	2	0%	2/15 Summer				
E11.002	15 Winter	2	0%	2/15 Summer				
E11.003	15 Winter	2	0%	2/15 Summer				
E11.004	15 Winter	2	0%					
E11.005	15 Winter	2	0%					
E12.000	15 Winter	2	0%					
E12.001	15 Winter	2	0%					
E12.002	15 Winter	2	0%	2/15 Summer				
E12.003	15 Winter	2	0%					
E11.006	15 Winter	2	0%					
E11.007	15 Winter	2	0%					
E11.008	15 Winter	2	0%					
E11.009	15 Winter	2	0%					
E11.010	15 Winter	2	0%					
E13.000	360 Winter	2	0%					
E13.001	15 Winter	2	0%					
E13.002	15 Winter	2	0%					
E13.003	15 Winter	2	0%					
E13.004	15 Winter	2	0%	2/15 Summer				
E13.005	15 Winter	2	0%					
E11.011	15 Winter	2	0%					
E11.012	15 Winter	2	0%					
E11.013	15 Winter	2	0%					
E11.014	15 Winter	2	0%					
E11.015	15 Winter	2	0%					
E11.016	15 Winter	2	0%	2/15 Winter				
E11.017	15 Winter	2	0%	2/15 Summer				
E1.012	15 Winter	2	0%	2/15 Summer				
E14.000	15 Winter	2	0%					
E14.001	15 Winter	2	0%	2/15 Summer				
E14.002	15 Winter	2	0%					
E14.003	15 Winter	2	0%					

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
E14.004	15 Winter	2	0%					
E14.005	15 Winter	2	0%					
E14.006	15 Winter	2	0%					
E15.000	15 Summer	2	0%					
E15.001	15 Winter	2	0%					
E15.002	15 Winter	2	0%	2/15 Winter				
E15.003	15 Winter	2	0%	2/15 Summer				
E15.004	15 Winter	2	0%					
E15.005	15 Winter	2	0%					
E14.007	15 Winter	2	0%	2/15 Summer				
E14.008	15 Winter	2	0%	2/15 Summer				
E14.009	15 Winter	2	0%	2/15 Summer				
E14.010	15 Winter	2	0%	2/15 Summer				
E14.011	15 Winter	2	0%	2/15 Summer				
E14.012	15 Winter	2	0%	2/15 Summer				
E1.013	15 Winter	2	0%	2/15 Summer				
E1.014	15 Winter	2	0%	2/15 Summer	2/15 Summer			5
E16.000	15 Winter	2	0%					
E16.001	15 Summer	2	0%					
E16.002	15 Winter	2	0%					
E16.003	15 Winter	2	0%					
E16.004	15 Winter	2	0%					
E1.015	15 Winter	2	0%	2/15 Summer				
E17.000	360 Winter	2	0%					
E17.001	360 Winter	2	0%					
E1.016	15 Summer	2	0%	2/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E1.000	E1	106.585	-0.047	0.000	0.81	0.0	32.4	OK
E1.001	E2	105.801	0.289	0.000	1.01	0.0	41.4	SURCHARGED
E1.002	E3	102.976	0.249	0.000	1.05	0.0	85.8	SURCHARGED
E1.003	E4	100.382	-0.120	0.000	0.68	0.0	85.4	OK
E1.004	E5	99.802	0.214	0.000	0.61	0.0	233.8	SURCHARGED
E2.000	E17	109.333	-0.029	0.000	0.99	0.0	14.8	OK
E2.001	E18	109.189	-0.024	0.000	1.00	0.0	14.4	OK
E2.002	E19	109.149	0.028	0.000	0.66	0.0	20.6	SURCHARGED
E2.003	E20	108.896	1.229	0.000	1.31	0.0	38.6	FLOOD RISK
E3.000	E27	107.929	-0.133	0.000	0.04	0.0	0.7	OK
E4.000	E29	109.368	0.116	0.000	1.03	0.0	29.8	SURCHARGED
E5.000	E30	108.307	-0.075	0.000	0.51	0.0	14.9	OK
E3.001	E28	107.580	-0.100	0.000	0.59	0.0	45.3	OK

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E6.000	E31	107.040	-0.092	0.000	0.33	0.0	11.3	OK
E2.004	E21	105.937	-0.048	0.000	0.98	0.0	90.1	OK
E7.000	E32	106.181	-0.121	0.000	0.10	0.0	3.2	OK
E7.001	E33	105.338	-0.277	0.000	0.02	0.0	3.2	OK
E8.000	E34	106.440	-0.102	0.000	0.24	0.0	7.5	OK
E8.001	E35	105.867	-0.045	0.000	0.82	0.0	17.8	OK
E8.002	E36	105.306	0.054	0.000	1.13	0.0	17.3	SURCHARGED
E2.005	E23	104.882	-0.159	0.000	0.46	0.0	109.4	OK
E2.006	E24	101.002	0.012	0.000	0.73	0.0	165.2	SURCHARGED
E2.007	E25	100.532	0.939	0.000	0.68	0.0	153.3	SURCHARGED
E2.008	E26	100.087	1.843	0.000	0.84	0.0	133.1	SURCHARGED
E2.009	E27	99.849	1.976	0.000	0.73	0.0	129.0	SURCHARGED
E2.010	E28	99.416	2.388	0.000	0.93	0.0	128.4	FLOOD RISK
E1.005	E6	99.172	2.428	0.000	1.75	0.0	318.0	FLOOD RISK
E1.006	E7	97.235	1.120	5.339	0.99	0.0	311.8	FLOOD
E9.000	E37	107.487	-0.132	0.000	0.38	0.0	38.1	OK
E9.001	E38	105.498	-0.128	0.000	0.41	0.0	38.0	OK
E9.002	E39	104.939	-0.070	0.000	0.81	0.0	49.5	OK
E9.003	E40	104.548	-0.101	0.000	0.59	0.0	57.3	OK
E9.004	E41	102.603	0.144	0.000	1.22	0.0	55.8	SURCHARGED
E9.005	E42	102.057	-0.112	0.000	0.52	0.0	55.8	OK
E9.006	E43	101.256	0.033	0.000	0.87	0.0	54.2	SURCHARGED
E10.000	E45	101.666	-0.093	0.000	0.66	0.0	49.0	OK
E9.007	E44	100.921	0.078	0.000	0.91	0.0	198.1	SURCHARGED
E1.007	E8	95.251	1.310	40.996	1.15	0.0	377.2	FLOOD
E1.008	E9	93.353	0.872	0.000	1.36	0.0	377.4	SURCHARGED
E1.009	E10	91.344	-0.316	0.000	0.47	0.0	428.0	OK
E1.010	E11	89.917	-0.113	0.000	0.58	0.0	435.8	OK
E1.011	E12	89.702	0.422	0.000	1.16	0.0	427.3	SURCHARGED
E11.000	E46	106.355	0.153	0.000	0.47	0.0	5.5	SURCHARGED
E11.001	E47	106.344	0.652	0.000	1.12	0.0	14.4	FLOOD RISK
E11.002	E48	104.544	0.282	0.000	1.14	0.0	15.4	SURCHARGED
E11.003	E49	103.550	0.048	0.000	1.05	0.0	20.1	SURCHARGED
E11.004	E49	102.895	-0.127	0.000	0.41	0.0	20.1	OK
E11.005	E50	102.755	-0.144	0.000	0.29	0.0	42.2	OK
E12.000	E61	105.731	-0.021	0.000	0.97	0.0	5.1	OK
E12.001	E62	105.566	-0.111	0.000	0.16	0.0	5.0	OK
E12.002	E63	103.438	0.336	0.000	1.30	0.0	29.6	SURCHARGED
E12.003	E64	102.567	-0.122	0.000	0.45	0.0	29.4	OK
E11.006	E51	101.608	-0.197	0.000	0.27	0.0	68.9	OK
E11.007	E52	98.465	-0.110	0.000	0.73	0.0	106.9	OK
E11.008	E53	97.907	-0.208	0.000	0.42	0.0	115.8	OK
E11.009	E54	96.290	-0.391	0.000	0.28	0.0	116.0	OK

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E11.010	E55	96.062	-0.458	0.000	0.14	0.0	125.0	OK
E13.000	E65	102.490	-0.229	0.000	0.00	0.0	0.0	OK
E13.001	E66	101.619	-0.168	0.000	0.16	0.0	16.3	OK
E13.002	E67	100.641	-0.116	0.000	0.48	0.0	42.5	OK
E13.003	E68	98.974	-0.151	0.000	0.50	0.0	82.5	OK
E13.004	E69	97.827	0.422	0.000	1.77	0.0	153.8	SURCHARGED
E13.005	E70	97.082	-0.123	0.000	0.66	0.0	163.9	OK
E11.011	E56	95.440	-0.270	0.000	0.59	0.0	368.2	OK
E11.012	E57	94.971	-0.339	0.000	0.41	0.0	404.9	OK
E11.013	E58	93.567	-0.333	0.000	0.42	0.0	516.8	OK
E11.014	E59	92.136	-0.324	0.000	0.45	0.0	546.3	OK
E11.015	E60	90.781	-0.289	0.000	0.54	0.0	573.8	OK
E11.016	E99	90.205	0.195	0.000	0.99	0.0	548.5	SURCHARGED
E11.017	E70	89.595	0.415	0.000	1.16	0.0	482.0	SURCHARGED
E1.012	E13	89.381	0.361	0.000	1.41	0.0	892.4	SURCHARGED
E14.000	E73	98.488	-0.121	0.000	0.46	0.0	40.0	OK
E14.001	E74	97.840	0.061	0.000	1.24	0.0	101.3	SURCHARGED
E14.002	E75	97.473	-0.176	0.000	0.37	0.0	101.7	OK
E14.003	E76	96.466	-0.069	0.000	0.95	0.0	126.9	OK
E14.004	E77	95.697	-0.128	0.000	0.63	0.0	126.6	OK
E14.005	E78	94.704	-0.121	0.000	0.67	0.0	127.4	OK
E14.006	E79	93.489	-0.126	0.000	0.64	0.0	133.1	OK
E15.000	E85	100.550	-0.099	0.000	0.61	0.0	61.3	OK
E15.001	E86	99.297	-0.052	0.000	0.95	0.0	95.3	OK
E15.002	E87	97.705	0.016	0.000	0.88	0.0	93.1	SURCHARGED
E15.003	E88	96.808	0.359	0.000	1.18	0.0	90.7	SURCHARGED
E15.004	E89	95.452	-0.057	0.000	0.92	0.0	90.3	OK
E15.005	E90	93.230	-0.155	0.000	0.48	0.0	103.4	OK
E14.007	E80	92.979	0.784	0.000	1.36	0.0	223.9	FLOOD RISK
E14.008	E81	92.314	0.543	0.000	1.45	0.0	238.6	SURCHARGED
E14.009	E82	91.867	0.346	0.000	0.81	0.0	225.5	SURCHARGED
E14.010	E100	91.063	0.842	0.000	2.20	0.0	245.2	FLOOD RISK
E14.011	E83	90.698	0.518	0.000	1.15	0.0	247.3	SURCHARGED
E14.012	E84	90.238	0.415	0.000	1.18	0.0	475.9	SURCHARGED
E1.013	E14	89.073	0.201	0.000	0.90	0.0	1328.1	SURCHARGED
E1.014	E15	87.577	0.585	86.849	1.01	0.0	1140.9	FLOOD
E16.000	E91	91.528	-0.297	0.000	0.01	0.0	1.1	OK
E16.001	E92	90.565	-0.295	0.000	0.01	0.0	1.1	OK
E16.002	E93	89.870	-0.280	0.000	0.32	0.0	175.5	OK
E16.003	E94	88.298	-0.250	0.000	0.43	0.0	175.6	OK
E16.004	E95	87.741	-0.307	0.000	0.24	0.0	175.6	OK
E1.015	E16	87.060	0.617	0.000	1.29	0.0	1176.1	SURCHARGED
E17.000	E99	90.530	-0.152	0.000	0.00	0.0	0.0	OK

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E17.001	E100	87.737	-0.533	0.000	0.00	0.0	0.0	OK
E1.016	E99	86.523	0.400	0.000	1.85	0.0	1169.7	SURCHARGED

Summary of Critical Results by Maximum Level (Rank 1) for Existing

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 30
Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
E1.000	15 Winter	30	0%	30/15 Summer	30/15 Summer			4
E1.001	15 Winter	30	0%	30/15 Summer	30/15 Summer			5
E1.002	15 Winter	30	0%	30/15 Summer	30/15 Summer			5
E1.003	15 Winter	30	0%	30/15 Summer				
E1.004	15 Winter	30	0%	30/15 Summer	30/15 Summer			6
E2.000	15 Winter	30	0%	30/15 Summer	30/15 Summer			2
E2.001	15 Winter	30	0%	30/15 Summer				
E2.002	15 Winter	30	0%	30/15 Summer	30/15 Summer			2
E2.003	15 Winter	30	0%	30/15 Summer	30/15 Summer			7
E3.000	15 Winter	30	0%					
E4.000	15 Winter	30	0%	30/15 Summer	30/15 Summer			4
E5.000	15 Winter	30	0%	30/15 Summer				
E3.001	15 Winter	30	0%	30/15 Summer				
E6.000	15 Winter	30	0%	30/15 Summer				
E2.004	15 Winter	30	0%	30/15 Summer				
E7.000	15 Winter	30	0%					
E7.001	15 Winter	30	0%					
E8.000	15 Winter	30	0%	30/15 Summer				
E8.001	15 Winter	30	0%	30/15 Summer	30/15 Summer			2
E8.002	15 Winter	30	0%	30/15 Summer				
E2.005	15 Winter	30	0%					
E2.006	15 Winter	30	0%	30/15 Summer	30/15 Summer			4
E2.007	15 Summer	30	0%	30/15 Summer				
E2.008	15 Winter	30	0%	30/15 Summer	30/15 Summer			6
E2.009	15 Winter	30	0%	30/15 Summer				
E2.010	30 Winter	30	0%	30/15 Summer	30/15 Summer			7
E1.005	30 Winter	30	0%	30/15 Summer	30/15 Summer			7
E1.006	30 Winter	30	0%	30/15 Summer	30/15 Summer			9
E9.000	15 Winter	30	0%	30/15 Summer				
E9.001	15 Winter	30	0%	30/15 Summer				
E9.002	15 Winter	30	0%	30/15 Summer	30/15 Summer			3

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
E9.003	15 Winter	30	0%	30/15 Summer				
E9.004	15 Winter	30	0%	30/15 Summer	30/15 Summer			2
E9.005	15 Winter	30	0%	30/15 Summer				
E9.006	15 Winter	30	0%	30/15 Summer	30/15 Summer			5
E10.000	15 Winter	30	0%	30/15 Summer	30/15 Summer			2
E9.007	15 Winter	30	0%	30/15 Summer	30/15 Summer			6
E1.007	30 Winter	30	0%	30/15 Summer	30/15 Summer			11
E1.008	15 Winter	30	0%	30/15 Summer				
E1.009	15 Winter	30	0%					
E1.010	15 Winter	30	0%	30/15 Summer				
E1.011	15 Winter	30	0%	30/15 Summer	30/15 Summer			4
E11.000	15 Winter	30	0%	30/15 Summer				
E11.001	15 Winter	30	0%	30/15 Summer	30/15 Summer			7
E11.002	15 Winter	30	0%	30/15 Summer	30/15 Winter			1
E11.003	15 Winter	30	0%	30/15 Summer				
E11.004	15 Winter	30	0%					
E11.005	15 Winter	30	0%					
E12.000	15 Winter	30	0%	30/15 Summer				
E12.001	15 Winter	30	0%					
E12.002	15 Winter	30	0%	30/15 Summer	30/15 Summer			5
E12.003	15 Winter	30	0%					
E11.006	15 Winter	30	0%					
E11.007	15 Winter	30	0%	30/15 Summer				
E11.008	15 Winter	30	0%					
E11.009	15 Winter	30	0%					
E11.010	15 Winter	30	0%					
E13.000	360 Winter	30	0%					
E13.001	15 Winter	30	0%	30/15 Summer				
E13.002	15 Winter	30	0%	30/15 Summer	30/15 Summer			2
E13.003	15 Winter	30	0%	30/15 Summer	30/15 Summer			4
E13.004	15 Winter	30	0%	30/15 Summer	30/15 Summer			4
E13.005	15 Summer	30	0%	30/15 Summer				
E11.011	15 Winter	30	0%	30/15 Summer				
E11.012	15 Winter	30	0%	30/15 Winter				
E11.013	15 Winter	30	0%	30/15 Summer				
E11.014	15 Winter	30	0%	30/15 Summer	30/15 Summer			2
E11.015	15 Winter	30	0%	30/15 Summer	30/15 Summer			4
E11.016	15 Winter	30	0%	30/15 Summer	30/15 Summer			6
E11.017	30 Winter	30	0%	30/15 Summer	30/15 Summer			6
E1.012	15 Winter	30	0%	30/15 Summer				
E14.000	15 Winter	30	0%	30/15 Summer				
E14.001	15 Winter	30	0%	30/15 Summer	30/15 Summer			2
E14.002	15 Winter	30	0%	30/15 Summer				
E14.003	15 Winter	30	0%	30/15 Summer	30/15 Summer			4

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
E14.004	15 Winter	30	0%	30/15 Summer				
E14.005	15 Winter	30	0%	30/15 Summer				
E14.006	15 Winter	30	0%	30/15 Summer				
E15.000	15 Winter	30	0%	30/15 Summer	30/15 Summer			2
E15.001	15 Winter	30	0%	30/15 Summer	30/15 Summer			4
E15.002	15 Winter	30	0%	30/15 Summer				
E15.003	15 Winter	30	0%	30/15 Summer				
E15.004	30 Winter	30	0%	30/15 Summer				
E15.005	15 Winter	30	0%	30/15 Summer				
E14.007	15 Winter	30	0%	30/15 Summer	30/15 Summer			6
E14.008	15 Winter	30	0%	30/15 Summer	30/15 Summer			4
E14.009	15 Winter	30	0%	30/15 Summer				
E14.010	30 Winter	30	0%	30/15 Summer	30/15 Summer			7
E14.011	15 Winter	30	0%	30/15 Summer	30/15 Summer			5
E14.012	15 Winter	30	0%	30/15 Summer	30/15 Summer			3
E1.013	15 Winter	30	0%	30/15 Summer				
E1.014	60 Winter	30	0%	30/15 Summer	30/15 Summer			11
E16.000	15 Summer	30	0%					
E16.001	15 Summer	30	0%					
E16.002	15 Winter	30	0%					
E16.003	15 Winter	30	0%	30/15 Summer				
E16.004	15 Winter	30	0%					
E1.015	60 Winter	30	0%	30/15 Summer				
E17.000	360 Winter	30	0%					
E17.001	360 Winter	30	0%					
E1.016	15 Winter	30	0%	30/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E1.000	E1	107.270	0.638	9.933	0.83	0.0	33.2	FLOOD
E1.001	E2	106.718	1.206	8.139	1.10	0.0	45.1	FLOOD
E1.002	E3	104.023	1.296	22.868	1.21	0.0	98.8	FLOOD
E1.003	E4	100.967	0.465	0.000	0.76	0.0	95.8	SURCHARGED
E1.004	E5	100.395	0.807	84.567	0.66	0.0	251.8	FLOOD
E2.000	E17	110.562	1.200	1.894	1.34	0.0	20.1	FLOOD
E2.001	E18	110.382	1.169	0.000	1.43	0.0	20.6	FLOOD RISK
E2.002	E19	110.231	1.110	0.853	0.91	0.0	28.6	FLOOD
E2.003	E20	109.033	1.366	33.169	1.35	0.0	39.5	FLOOD
E3.000	E27	108.018	-0.044	0.000	0.09	0.0	1.6	OK
E4.000	E29	110.458	1.206	7.762	1.33	0.0	38.4	FLOOD
E5.000	E30	108.712	0.330	0.000	1.08	0.0	31.7	SURCHARGED
E3.001	E28	108.010	0.330	0.000	0.88	0.0	66.8	SURCHARGED

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E6.000	E31	107.235	0.103	0.000	0.76	0.0	25.6	SURCHARGED
E2.004	E21	106.698	0.713	0.000	1.33	0.0	122.3	FLOOD RISK
E7.000	E32	106.200	-0.102	0.000	0.24	0.0	7.8	OK
E7.001	E33	105.352	-0.263	0.000	0.05	0.0	7.8	OK
E8.000	E34	107.040	0.498	0.000	0.55	0.0	16.9	SURCHARGED
E8.001	E35	106.832	0.920	2.450	1.34	0.0	29.1	FLOOD
E8.002	E36	105.742	0.490	0.000	1.83	0.0	28.0	SURCHARGED
E2.005	E23	104.916	-0.125	0.000	0.65	0.0	154.8	OK
E2.006	E24	102.822	1.832	21.825	0.87	0.0	197.2	FLOOD
E2.007	E25	101.761	2.168	0.000	0.88	0.0	196.8	FLOOD RISK
E2.008	E26	100.728	2.484	18.569	1.08	0.0	171.0	FLOOD
E2.009	E27	100.301	2.428	0.000	0.96	0.0	170.9	SURCHARGED
E2.010	E28	99.550	2.522	60.197	1.79	0.0	247.3	FLOOD
E1.005	E6	99.343	2.599	43.109	1.81	0.0	328.0	FLOOD
E1.006	E7	97.301	1.186	70.639	0.99	0.0	312.2	FLOOD
E9.000	E37	107.774	0.155	0.000	0.85	0.0	86.3	SURCHARGED
E9.001	E38	106.387	0.761	0.000	0.86	0.0	80.3	FLOOD RISK
E9.002	E39	105.938	0.929	8.105	1.40	0.0	85.4	FLOOD
E9.003	E40	105.548	0.899	0.000	0.92	0.0	89.8	FLOOD RISK
E9.004	E41	103.880	1.421	0.197	1.79	0.0	82.1	FLOOD
E9.005	E42	102.951	0.782	0.000	0.76	0.0	82.1	SURCHARGED
E9.006	E43	102.412	1.189	12.608	0.96	0.0	60.2	FLOOD
E10.000	E45	102.885	1.126	4.749	0.99	0.0	73.9	FLOOD
E9.007	E44	102.025	1.182	75.331	0.99	0.0	216.0	FLOOD
E1.007	E8	95.415	1.474	204.765	1.17	0.0	383.5	FLOOD
E1.008	E9	93.467	0.986	0.000	1.39	0.0	387.2	FLOOD RISK
E1.009	E10	91.461	-0.199	0.000	0.64	0.0	587.5	OK
E1.010	E11	90.922	0.892	0.000	0.76	0.0	576.9	FLOOD RISK
E1.011	E12	90.489	1.209	19.407	1.33	0.0	490.3	FLOOD
E11.000	E46	106.955	0.753	0.000	0.97	0.0	11.4	FLOOD RISK
E11.001	E47	106.468	0.776	18.012	1.18	0.0	15.2	FLOOD
E11.002	E48	105.160	0.898	0.084	1.22	0.0	16.6	FLOOD
E11.003	E49	104.261	0.759	0.000	1.59	0.0	30.4	FLOOD RISK
E11.004	E49	102.924	-0.098	0.000	0.62	0.0	30.4	OK
E11.005	E50	102.812	-0.087	0.000	0.69	0.0	98.7	OK
E12.000	E61	106.161	0.409	0.000	2.06	0.0	10.9	SURCHARGED
E12.001	E62	105.587	-0.090	0.000	0.34	0.0	10.7	OK
E12.002	E63	104.115	1.013	14.596	1.76	0.0	40.0	FLOOD
E12.003	E64	102.589	-0.100	0.000	0.61	0.0	40.0	OK
E11.006	E51	101.661	-0.144	0.000	0.54	0.0	136.4	OK
E11.007	E52	99.495	0.920	0.000	1.71	0.0	251.4	SURCHARGED
E11.008	E53	98.112	-0.003	0.000	0.99	0.0	272.4	OK
E11.009	E54	96.433	-0.248	0.000	0.65	0.0	272.2	OK

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E11.010	E55	96.154	-0.366	0.000	0.33	0.0	296.2	OK
E13.000	E65	102.490	-0.229	0.000	0.00	0.0	0.0	OK
E13.001	E66	102.029	0.242	0.000	0.45	0.0	46.2	SURCHARGED
E13.002	E67	101.832	1.075	2.497	1.00	0.0	89.1	FLOOD
E13.003	E68	100.122	0.997	12.029	0.83	0.0	138.6	FLOOD
E13.004	E69	98.931	1.526	30.979	2.89	0.0	250.8	FLOOD
E13.005	E70	97.613	0.408	0.000	1.05	0.0	261.0	SURCHARGED
E11.011	E56	95.996	0.286	0.000	1.27	0.0	787.0	SURCHARGED
E11.012	E57	95.399	0.089	0.000	0.85	0.0	846.3	SURCHARGED
E11.013	E58	94.365	0.465	0.000	0.91	0.0	1110.6	FLOOD RISK
E11.014	E59	93.182	0.722	21.783	0.87	0.0	1060.8	FLOOD
E11.015	E60	92.145	1.075	35.122	0.99	0.0	1050.8	FLOOD
E11.016	E99	91.284	1.274	235.267	1.26	0.0	698.2	FLOOD
E11.017	E70	90.300	1.120	79.978	1.54	0.0	636.8	FLOOD
E1.012	E13	90.066	1.046	0.000	1.65	0.0	1038.5	FLOOD RISK
E14.000	E73	99.786	1.177	0.000	0.98	0.0	85.9	FLOOD RISK
E14.001	E74	98.968	1.189	8.206	2.45	0.0	200.2	FLOOD
E14.002	E75	98.193	0.544	0.000	0.73	0.0	200.1	SURCHARGED
E14.003	E76	97.604	1.069	24.320	1.50	0.0	200.3	FLOOD
E14.004	E77	96.310	0.485	0.000	0.90	0.0	181.9	SURCHARGED
E14.005	E78	95.517	0.692	0.000	0.95	0.0	181.3	SURCHARGED
E14.006	E79	94.446	0.831	0.000	0.91	0.0	188.0	FLOOD RISK
E15.000	E85	101.775	1.126	4.799	1.00	0.0	99.7	FLOOD
E15.001	E86	100.493	1.144	22.982	1.15	0.0	115.5	FLOOD
E15.002	E87	98.767	1.078	0.000	1.00	0.0	106.3	FLOOD RISK
E15.003	E88	97.614	1.165	0.000	1.33	0.0	102.4	SURCHARGED
E15.004	E89	95.968	0.459	0.000	1.03	0.0	102.1	SURCHARGED
E15.005	E90	93.743	0.358	0.000	0.63	0.0	135.9	SURCHARGED
E14.007	E80	93.318	1.123	78.262	1.33	0.0	219.3	FLOOD
E14.008	E81	92.745	0.974	5.278	1.52	0.0	250.4	FLOOD
E14.009	E82	92.222	0.701	0.000	0.87	0.0	242.2	SURCHARGED
E14.010	E100	91.339	1.118	149.409	2.71	0.0	302.1	FLOOD
E14.011	E83	91.262	1.082	72.123	1.60	0.0	343.4	FLOOD
E14.012	E84	91.315	1.492	24.912	1.49	0.0	603.9	FLOOD
E1.013	E14	89.690	0.818	0.000	1.05	0.0	1545.0	FLOOD RISK
E1.014	E15	87.950	0.958	461.439	1.10	0.0	1251.3	FLOOD
E16.000	E91	91.539	-0.286	0.000	0.01	0.0	2.8	OK
E16.001	E92	90.579	-0.281	0.000	0.02	0.0	2.8	OK
E16.002	E93	90.020	-0.130	0.000	0.84	0.0	462.4	OK
E16.003	E94	88.675	0.127	0.000	1.13	0.0	465.4	SURCHARGED
E16.004	E95	87.892	-0.156	0.000	0.63	0.0	463.4	OK
E1.015	E16	87.282	0.839	0.000	1.42	0.0	1296.8	SURCHARGED
E17.000	E99	90.530	-0.152	0.000	0.00	0.0	0.0	OK

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E17.001	E100	87.737	-0.533	0.000	0.00	0.0	0.0	OK
E1.016	E99	86.639	0.516	0.000	2.06	0.0	1297.9	SURCHARGED

Summary of Critical Results by Maximum Level (Rank 1) for Existing

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 100
Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
E1.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			6
E1.001	15 Winter	100	0%	100/15 Summer	100/15 Summer			7
E1.002	15 Winter	100	0%	100/15 Summer	100/15 Summer			7
E1.003	15 Winter	100	0%	100/15 Summer				
E1.004	15 Winter	100	0%	100/15 Summer	100/15 Summer			9
E2.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			6
E2.001	15 Summer	100	0%	100/15 Summer				
E2.002	15 Winter	100	0%	100/15 Summer	100/15 Summer			5
E2.003	15 Winter	100	0%	100/15 Summer	100/15 Summer			9
E3.000	15 Winter	100	0%	100/15 Summer				
E4.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			6
E5.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			2
E3.001	15 Winter	100	0%	100/15 Summer				
E6.000	15 Winter	100	0%	100/15 Summer				
E2.004	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
E7.000	15 Winter	100	0%					
E7.001	15 Winter	100	0%					
E8.000	15 Winter	100	0%	100/15 Summer				
E8.001	15 Winter	100	0%	100/15 Summer	100/15 Summer			5
E8.002	15 Winter	100	0%	100/15 Summer				
E2.005	15 Winter	100	0%					
E2.006	15 Winter	100	0%	100/15 Summer	100/15 Summer			6
E2.007	15 Winter	100	0%	100/15 Summer				
E2.008	30 Winter	100	0%	100/15 Summer	100/15 Summer			7
E2.009	30 Winter	100	0%	100/15 Summer				
E2.010	30 Winter	100	0%	100/15 Summer	100/15 Summer			11
E1.005	60 Winter	100	0%	100/15 Summer	100/15 Summer			9
E1.006	60 Winter	100	0%	100/15 Summer	100/15 Summer			11
E9.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			2
E9.001	15 Winter	100	0%	100/15 Summer	100/15 Summer			3
E9.002	15 Winter	100	0%	100/15 Summer	100/15 Summer			5

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
E9.003	15 Winter	100	0%	100/15 Summer	100/15 Summer			2
E9.004	15 Winter	100	0%	100/15 Summer	100/15 Summer			5
E9.005	15 Winter	100	0%	100/15 Summer				
E9.006	15 Winter	100	0%	100/15 Summer	100/15 Summer			6
E10.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			5
E9.007	15 Winter	100	0%	100/15 Summer	100/15 Summer			7
E1.007	60 Winter	100	0%	100/15 Summer	100/15 Summer			13
E1.008	15 Winter	100	0%	100/15 Summer	100/15 Winter			1
E1.009	15 Winter	100	0%	100/15 Summer				
E1.010	15 Winter	100	0%	100/15 Summer				
E1.011	15 Winter	100	0%	100/15 Summer	100/15 Summer			7
E11.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
E11.001	15 Winter	100	0%	100/15 Summer	100/15 Summer			11
E11.002	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
E11.003	15 Winter	100	0%	100/15 Summer	100/15 Summer			2
E11.004	15 Winter	100	0%					
E11.005	15 Winter	100	0%	100/15 Summer				
E12.000	15 Winter	100	0%	100/15 Summer				
E12.001	15 Winter	100	0%					
E12.002	15 Winter	100	0%	100/15 Summer	100/15 Summer			7
E12.003	15 Winter	100	0%					
E11.006	15 Winter	100	0%	100/15 Summer				
E11.007	15 Winter	100	0%	100/15 Summer	100/15 Summer			2
E11.008	15 Winter	100	0%	100/15 Summer				
E11.009	15 Winter	100	0%	100/15 Summer				
E11.010	15 Winter	100	0%	100/15 Summer				
E13.000	360 Winter	100	0%					
E13.001	15 Winter	100	0%	100/15 Summer				
E13.002	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
E13.003	15 Winter	100	0%	100/15 Summer	100/15 Summer			5
E13.004	15 Winter	100	0%	100/15 Summer	100/15 Summer			6
E13.005	15 Winter	100	0%	100/15 Summer				
E11.011	15 Winter	100	0%	100/15 Summer				
E11.012	15 Winter	100	0%	100/15 Summer				
E11.013	15 Winter	100	0%	100/15 Summer	100/15 Summer			2
E11.014	15 Winter	100	0%	100/15 Summer	100/15 Summer			5
E11.015	15 Winter	100	0%	100/15 Summer	100/15 Summer			6
E11.016	30 Winter	100	0%	100/15 Summer	100/15 Summer			9
E11.017	30 Winter	100	0%	100/15 Summer	100/15 Summer			9
E1.012	15 Winter	100	0%	100/15 Summer				
E14.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			3
E14.001	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
E14.002	15 Winter	100	0%	100/15 Summer				
E14.003	15 Winter	100	0%	100/15 Summer	100/15 Summer			6

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
E14.004	15 Winter	100	0%	100/15 Summer				
E14.005	15 Winter	100	0%	100/15 Summer				
E14.006	15 Winter	100	0%	100/15 Summer				
E15.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
E15.001	15 Winter	100	0%	100/15 Summer	100/15 Summer			6
E15.002	15 Winter	100	0%	100/15 Summer	100/15 Winter			1
E15.003	15 Winter	100	0%	100/15 Summer				
E15.004	15 Winter	100	0%	100/15 Summer				
E15.005	15 Winter	100	0%	100/15 Summer				
E14.007	30 Winter	100	0%	100/15 Summer	100/15 Summer			9
E14.008	15 Winter	100	0%	100/15 Summer	100/15 Summer			6
E14.009	30 Winter	100	0%	100/15 Summer				
E14.010	30 Winter	100	0%	100/15 Summer	100/15 Summer			9
E14.011	15 Winter	100	0%	100/15 Summer	100/15 Summer			7
E14.012	15 Winter	100	0%	100/15 Summer	100/15 Summer			5
E1.013	30 Winter	100	0%	100/15 Summer				
E1.014	60 Winter	100	0%	100/15 Summer	100/15 Summer			13
E16.000	15 Summer	100	0%					
E16.001	15 Winter	100	0%	100/15 Summer				
E16.002	15 Winter	100	0%	100/15 Summer				
E16.003	15 Winter	100	0%	100/15 Summer				
E16.004	15 Winter	100	0%	100/15 Summer				
E1.015	15 Winter	100	0%	100/15 Summer				
E17.000	360 Winter	100	0%					
E17.001	360 Winter	100	0%					
E1.016	15 Winter	100	0%	100/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E1.000	E1	107.285	0.653	24.539	0.82	0.0	32.9	FLOOD
E1.001	E2	106.728	1.216	17.959	1.12	0.0	46.0	FLOOD
E1.002	E3	104.054	1.327	53.657	1.21	0.0	99.0	FLOOD
E1.003	E4	101.059	0.557	0.000	0.76	0.0	95.6	SURCHARGED
E1.004	E5	100.497	0.909	187.152	0.66	0.0	251.6	FLOOD
E2.000	E17	110.568	1.206	8.047	1.33	0.0	19.9	FLOOD
E2.001	E18	110.382	1.169	0.000	1.48	0.0	21.3	FLOOD RISK
E2.002	E19	110.234	1.113	4.426	0.91	0.0	28.5	FLOOD
E2.003	E20	109.060	1.393	60.400	1.35	0.0	39.7	FLOOD
E3.000	E27	108.402	0.340	0.000	0.15	0.0	2.8	SURCHARGED
E4.000	E29	110.473	1.221	23.009	1.33	0.0	38.5	FLOOD
E5.000	E30	109.481	1.099	1.194	1.34	0.0	39.2	FLOOD
E3.001	E28	108.393	0.713	0.000	0.98	0.0	74.5	FLOOD RISK

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E6.000	E31	108.012	0.880	0.000	1.04	0.0	35.2	SURCHARGED
E2.004	E21	106.754	0.769	3.895	1.35	0.0	124.6	FLOOD
E7.000	E32	106.212	-0.090	0.000	0.36	0.0	11.7	OK
E7.001	E33	105.362	-0.253	0.000	0.07	0.0	11.7	OK
E8.000	E34	107.321	0.779	0.000	0.85	0.0	26.2	SURCHARGED
E8.001	E35	106.841	0.929	10.635	1.35	0.0	29.4	FLOOD
E8.002	E36	105.745	0.493	0.000	1.84	0.0	28.0	SURCHARGED
E2.005	E23	104.922	-0.119	0.000	0.68	0.0	162.6	OK
E2.006	E24	102.860	1.870	60.402	0.89	0.0	200.5	FLOOD
E2.007	E25	101.785	2.192	0.000	0.88	0.0	198.6	FLOOD RISK
E2.008	E26	100.748	2.504	37.814	1.08	0.0	170.8	FLOOD
E2.009	E27	100.327	2.454	0.000	0.96	0.0	170.8	SURCHARGED
E2.010	E28	99.592	2.564	102.424	1.77	0.0	243.7	FLOOD
E1.005	E6	99.383	2.639	82.571	1.81	0.0	327.9	FLOOD
E1.006	E7	97.363	1.248	133.029	0.99	0.0	311.7	FLOOD
E9.000	E37	108.742	1.123	1.965	1.09	0.0	110.2	FLOOD
E9.001	E38	106.399	0.773	8.746	0.86	0.0	80.2	FLOOD
E9.002	E39	105.954	0.945	23.525	1.42	0.0	86.6	FLOOD
E9.003	E40	105.611	0.962	0.952	0.95	0.0	92.8	FLOOD
E9.004	E41	103.881	1.422	1.144	1.79	0.0	82.1	FLOOD
E9.005	E42	102.962	0.793	0.000	0.76	0.0	82.1	SURCHARGED
E9.006	E43	102.427	1.204	27.560	0.96	0.0	59.9	FLOOD
E10.000	E45	102.903	1.144	23.092	0.99	0.0	73.6	FLOOD
E9.007	E44	102.108	1.265	158.306	0.99	0.0	216.8	FLOOD
E1.007	E8	95.540	1.599	330.003	1.19	0.0	389.2	FLOOD
E1.008	E9	93.750	1.269	0.031	1.40	0.0	388.9	FLOOD
E1.009	E10	91.868	0.208	0.000	0.71	0.0	651.4	SURCHARGED
E1.010	E11	91.127	1.097	0.000	0.91	0.0	686.7	FLOOD RISK
E1.011	E12	90.539	1.259	69.581	1.30	0.0	479.9	FLOOD
E11.000	E46	107.001	0.799	1.422	1.02	0.0	12.0	FLOOD
E11.001	E47	106.484	0.792	34.060	1.18	0.0	15.2	FLOOD
E11.002	E48	105.162	0.900	1.539	1.40	0.0	19.0	FLOOD
E11.003	E49	104.451	0.949	1.291	1.73	0.0	33.0	FLOOD
E11.004	E49	102.995	-0.027	0.000	0.71	0.0	35.0	OK
E11.005	E50	102.942	0.043	0.000	0.93	0.0	132.7	SURCHARGED
E12.000	E61	106.690	0.938	0.000	2.88	0.0	15.2	SURCHARGED
E12.001	E62	105.600	-0.077	0.000	0.48	0.0	14.8	OK
E12.002	E63	104.134	1.032	34.413	1.77	0.0	40.3	FLOOD
E12.003	E64	102.589	-0.100	0.000	0.61	0.0	40.2	OK
E11.006	E51	102.078	0.273	0.000	0.64	0.0	163.0	SURCHARGED
E11.007	E52	100.755	2.180	4.746	2.01	0.0	294.8	FLOOD
E11.008	E53	99.156	1.041	0.000	1.17	0.0	320.3	SURCHARGED
E11.009	E54	97.298	0.617	0.000	0.85	0.0	353.7	SURCHARGED

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E11.010	E55	97.234	0.714	0.000	0.44	0.0	389.5	SURCHARGED
E13.000	E65	102.490	-0.229	0.000	0.00	0.0	0.0	OK
E13.001	E66	102.381	0.594	0.000	0.70	0.0	71.2	SURCHARGED
E13.002	E67	101.851	1.094	21.142	1.00	0.0	89.1	FLOOD
E13.003	E68	100.146	1.021	35.574	0.83	0.0	138.1	FLOOD
E13.004	E69	98.992	1.587	91.700	2.93	0.0	253.7	FLOOD
E13.005	E70	98.228	1.023	0.000	1.05	0.0	262.4	FLOOD RISK
E11.011	E56	97.115	1.405	0.000	1.42	0.0	886.3	SURCHARGED
E11.012	E57	96.277	0.967	0.000	1.05	0.0	1040.8	SURCHARGED
E11.013	E58	94.683	0.783	43.088	1.01	0.0	1228.7	FLOOD
E11.014	E59	93.275	0.815	115.690	0.89	0.0	1082.0	FLOOD
E11.015	E60	92.207	1.137	96.953	0.99	0.0	1057.3	FLOOD
E11.016	E99	91.453	1.443	406.976	1.18	0.0	652.5	FLOOD
E11.017	E70	90.400	1.220	180.241	1.48	0.0	611.5	FLOOD
E1.012	E13	90.148	1.128	0.000	1.65	0.0	1039.8	FLOOD RISK
E14.000	E73	100.027	1.418	7.229	1.12	0.0	98.1	FLOOD
E14.001	E74	99.003	1.224	42.633	2.46	0.0	200.9	FLOOD
E14.002	E75	98.223	0.574	0.000	0.73	0.0	200.8	SURCHARGED
E14.003	E76	97.633	1.098	53.456	1.51	0.0	202.5	FLOOD
E14.004	E77	96.365	0.540	0.000	0.90	0.0	181.4	SURCHARGED
E14.005	E78	95.594	0.769	0.000	0.95	0.0	181.5	FLOOD RISK
E14.006	E79	94.565	0.950	0.000	0.95	0.0	196.5	FLOOD RISK
E15.000	E85	101.796	1.147	26.202	1.00	0.0	99.8	FLOOD
E15.001	E86	100.519	1.170	49.300	1.15	0.0	115.5	FLOOD
E15.002	E87	98.810	1.121	0.023	1.00	0.0	105.9	FLOOD
E15.003	E88	97.673	1.224	0.000	1.33	0.0	102.5	SURCHARGED
E15.004	E89	96.050	0.541	0.000	1.04	0.0	102.8	SURCHARGED
E15.005	E90	93.935	0.550	0.000	0.74	0.0	158.8	SURCHARGED
E14.007	E80	93.384	1.189	144.904	1.32	0.0	217.2	FLOOD
E14.008	E81	92.760	0.989	19.972	1.55	0.0	254.3	FLOOD
E14.009	E82	92.268	0.747	0.000	0.87	0.0	242.3	SURCHARGED
E14.010	E100	91.448	1.227	258.075	2.72	0.0	303.6	FLOOD
E14.011	E83	91.343	1.163	153.324	1.62	0.0	345.9	FLOOD
E14.012	E84	91.436	1.613	145.676	1.52	0.0	616.3	FLOOD
E1.013	E14	89.809	0.937	0.000	1.05	0.0	1547.9	FLOOD RISK
E1.014	E15	88.126	1.134	636.314	1.18	0.0	1333.7	FLOOD
E16.000	E91	91.548	-0.277	0.000	0.02	0.0	4.2	OK
E16.001	E92	91.307	0.447	0.000	0.08	0.0	14.0	SURCHARGED
E16.002	E93	91.308	1.158	0.000	1.09	0.0	595.5	FLOOD RISK
E16.003	E94	89.430	0.882	0.000	1.42	0.0	585.5	SURCHARGED
E16.004	E95	88.442	0.394	0.000	0.79	0.0	584.9	SURCHARGED
E1.015	E16	87.493	1.050	0.000	1.53	0.0	1398.2	SURCHARGED
E17.000	E99	90.530	-0.152	0.000	0.00	0.0	0.0	OK

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E17.001	E100	87.737	-0.533	0.000	0.00	0.0	0.0	OK
E1.016	E99	86.744	0.621	0.000	2.21	0.0	1397.5	SURCHARGED

Summary of Critical Results by Maximum Level (Rank 1) for Existing

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 100
Climate Change (%) 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
E1.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			8
E1.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			9
E1.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			9
E1.003	15 Winter	100	+30%	100/15 Summer				
E1.004	15 Winter	100	+30%	100/15 Summer	100/15 Summer			11
E2.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			6
E2.001	15 Summer	100	+30%	100/15 Summer				
E2.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			6
E2.003	30 Winter	100	+30%	100/15 Summer	100/15 Summer			12
E3.000	15 Winter	100	+30%	100/15 Summer				
E4.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			7
E5.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
E3.001	15 Winter	100	+30%	100/15 Summer				
E6.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
E2.004	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
E7.000	15 Winter	100	+30%					
E7.001	15 Winter	100	+30%					
E8.000	15 Winter	100	+30%	100/15 Summer				
E8.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			6
E8.002	15 Winter	100	+30%	100/15 Summer				
E2.005	15 Winter	100	+30%					
E2.006	15 Winter	100	+30%	100/15 Summer	100/15 Summer			8
E2.007	30 Winter	100	+30%	100/15 Summer				
E2.008	60 Winter	100	+30%	100/15 Summer	100/15 Summer			9
E2.009	60 Winter	100	+30%	100/15 Summer				
E2.010	60 Winter	100	+30%	100/15 Summer	100/15 Summer			13
E1.005	60 Winter	100	+30%	100/15 Summer	100/15 Summer			12
E1.006	120 Winter	100	+30%	100/15 Summer	100/15 Summer			13
E9.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			3
E9.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
E9.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			6

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
E9.003	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
E9.004	15 Winter	100	+30%	100/15 Summer	100/15 Summer			6
E9.005	30 Winter	100	+30%	100/15 Summer				
E9.006	30 Winter	100	+30%	100/15 Summer	100/15 Summer			8
E10.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			6
E9.007	15 Winter	100	+30%	100/15 Summer	100/15 Summer			9
E1.007	60 Winter	100	+30%	100/15 Summer	100/15 Summer			15
E1.008	15 Winter	100	+30%	100/15 Summer	100/15 Summer			3
E1.009	15 Winter	100	+30%	100/15 Summer				
E1.010	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
E1.011	30 Winter	100	+30%	100/15 Summer	100/15 Summer			10
E11.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
E11.001	30 Winter	100	+30%	100/15 Summer	100/15 Summer			13
E11.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			6
E11.003	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
E11.004	15 Winter	100	+30%	100/15 Summer				
E11.005	15 Winter	100	+30%	100/15 Summer				
E12.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
E12.001	15 Winter	100	+30%					
E12.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			9
E12.003	15 Winter	100	+30%	100/15 Winter				
E11.006	15 Winter	100	+30%	100/15 Summer				
E11.007	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
E11.008	15 Winter	100	+30%	100/15 Summer				
E11.009	15 Summer	100	+30%	100/15 Summer				
E11.010	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
E13.000	15 Winter	100	+30%					
E13.001	15 Winter	100	+30%	100/15 Summer				
E13.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			6
E13.003	15 Winter	100	+30%	100/15 Summer	100/15 Summer			6
E13.004	15 Winter	100	+30%	100/15 Summer	100/15 Summer			7
E13.005	15 Winter	100	+30%	100/15 Summer	100/15 Summer			3
E11.011	15 Summer	100	+30%	100/15 Summer				
E11.012	15 Winter	100	+30%	100/15 Summer	100/15 Winter			1
E11.013	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
E11.014	15 Winter	100	+30%	100/15 Summer	100/15 Summer			6
E11.015	30 Winter	100	+30%	100/15 Summer	100/15 Summer			7
E11.016	30 Winter	100	+30%	100/15 Summer	100/15 Summer			11
E11.017	60 Winter	100	+30%	100/15 Summer	100/15 Summer			11
E1.012	60 Winter	100	+30%	100/15 Summer	100/15 Summer			2
E14.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
E14.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			6
E14.002	15 Winter	100	+30%	100/15 Summer				
E14.003	30 Winter	100	+30%	100/15 Summer	100/15 Summer			7

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
E14.004	15 Winter	100	+30%	100/15 Summer				
E14.005	15 Winter	100	+30%	100/15 Summer				
E14.006	15 Winter	100	+30%	100/15 Summer	100/15 Winter			1
E15.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			6
E15.001	30 Winter	100	+30%	100/15 Summer	100/15 Summer			7
E15.002	30 Winter	100	+30%	100/15 Summer	100/15 Summer			6
E15.003	15 Winter	100	+30%	100/15 Summer				
E15.004	15 Winter	100	+30%	100/15 Summer				
E15.005	15 Winter	100	+30%	100/15 Summer				
E14.007	30 Winter	100	+30%	100/15 Summer	100/15 Summer			11
E14.008	15 Winter	100	+30%	100/15 Summer	100/15 Summer			7
E14.009	60 Winter	100	+30%	100/15 Summer				
E14.010	60 Winter	100	+30%	100/15 Summer	100/15 Summer			12
E14.011	30 Winter	100	+30%	100/15 Summer	100/15 Summer			9
E14.012	15 Winter	100	+30%	100/15 Summer	100/15 Summer			6
E1.013	30 Winter	100	+30%	100/15 Summer				
E1.014	120 Winter	100	+30%	100/15 Summer	100/15 Summer			15
E16.000	15 Winter	100	+30%					
E16.001	15 Winter	100	+30%	100/15 Summer				
E16.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
E16.003	15 Winter	100	+30%	100/15 Summer				
E16.004	15 Winter	100	+30%	100/15 Summer				
E1.015	15 Winter	100	+30%	100/15 Summer				
E17.000	360 Winter	100	+30%					
E17.001	360 Winter	100	+30%					
E1.016	15 Winter	100	+30%	100/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E1.000	E1	107.299	0.667	38.658	0.84	0.0	33.6	FLOOD
E1.001	E2	106.737	1.225	27.189	1.14	0.0	46.7	FLOOD
E1.002	E3	104.083	1.356	83.336	1.21	0.0	98.4	FLOOD
E1.003	E4	101.144	0.642	0.000	0.76	0.0	95.4	FLOOD RISK
E1.004	E5	100.593	1.005	282.620	0.66	0.0	254.2	FLOOD
E2.000	E17	110.574	1.212	14.167	1.31	0.0	19.6	FLOOD
E2.001	E18	110.389	1.176	0.000	1.48	0.0	21.3	FLOOD RISK
E2.002	E19	110.238	1.117	8.146	0.91	0.0	28.5	FLOOD
E2.003	E20	109.088	1.421	87.790	1.36	0.0	39.9	FLOOD
E3.000	E27	108.423	0.361	0.000	0.17	0.0	3.0	SURCHARGED
E4.000	E29	110.488	1.236	37.545	1.34	0.0	38.6	FLOOD
E5.000	E30	109.486	1.104	5.709	1.36	0.0	40.0	FLOOD
E3.001	E28	108.405	0.725	0.000	0.99	0.0	75.0	FLOOD RISK

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E6.000	E31	108.331	1.199	1.341	1.17	0.0	39.7	FLOOD
E2.004	E21	106.758	0.773	8.377	1.35	0.0	124.8	FLOOD
E7.000	E32	106.222	-0.080	0.000	0.46	0.0	15.2	OK
E7.001	E33	105.372	-0.243	0.000	0.09	0.0	15.2	OK
E8.000	E34	107.640	1.098	0.000	1.09	0.0	33.8	FLOOD RISK
E8.001	E35	106.849	0.937	18.941	1.35	0.0	29.3	FLOOD
E8.002	E36	105.749	0.497	0.000	1.84	0.0	28.1	SURCHARGED
E2.005	E23	104.925	-0.116	0.000	0.70	0.0	166.8	OK
E2.006	E24	102.896	1.906	95.903	0.91	0.0	204.6	FLOOD
E2.007	E25	101.798	2.205	0.000	0.89	0.0	199.5	FLOOD RISK
E2.008	E26	100.766	2.522	56.014	1.08	0.0	170.6	FLOOD
E2.009	E27	100.352	2.479	0.000	0.96	0.0	170.5	SURCHARGED
E2.010	E28	99.637	2.609	146.741	1.78	0.0	245.8	FLOOD
E1.005	E6	99.425	2.681	124.709	1.81	0.0	327.9	FLOOD
E1.006	E7	97.425	1.310	196.575	0.99	0.0	310.8	FLOOD
E9.000	E37	108.752	1.133	11.645	1.09	0.0	110.3	FLOOD
E9.001	E38	106.405	0.779	15.707	0.86	0.0	80.2	FLOOD
E9.002	E39	105.965	0.956	34.520	1.40	0.0	85.4	FLOOD
E9.003	E40	105.614	0.965	3.517	0.95	0.0	92.7	FLOOD
E9.004	E41	103.882	1.423	2.172	1.79	0.0	82.1	FLOOD
E9.005	E42	102.973	0.804	0.000	0.76	0.0	82.1	SURCHARGED
E9.006	E43	102.445	1.222	44.921	0.96	0.0	60.3	FLOOD
E10.000	E45	102.922	1.163	42.238	0.99	0.0	73.7	FLOOD
E9.007	E44	102.183	1.340	232.694	1.00	0.0	217.6	FLOOD
E1.007	E8	95.648	1.707	439.897	1.20	0.0	394.6	FLOOD
E1.008	E9	93.756	1.275	5.792	1.46	0.0	405.0	FLOOD
E1.009	E10	92.182	0.522	0.000	0.78	0.0	719.7	SURCHARGED
E1.010	E11	91.226	1.196	5.921	0.97	0.0	736.8	FLOOD
E1.011	E12	90.592	1.312	122.133	1.27	0.0	468.3	FLOOD
E11.000	E46	107.003	0.801	3.292	1.02	0.0	12.0	FLOOD
E11.001	E47	106.499	0.807	48.798	1.19	0.0	15.2	FLOOD
E11.002	E48	105.163	0.901	2.658	1.42	0.0	19.4	FLOOD
E11.003	E49	104.455	0.953	5.002	1.73	0.0	33.1	FLOOD
E11.004	E49	103.600	0.578	0.000	0.86	0.0	42.2	SURCHARGED
E11.005	E50	103.565	0.666	0.000	1.01	0.0	145.4	SURCHARGED
E12.000	E61	107.000	1.248	0.465	3.32	0.0	17.5	FLOOD
E12.001	E62	105.607	-0.070	0.000	0.56	0.0	17.5	OK
E12.002	E63	104.153	1.051	53.497	1.78	0.0	40.5	FLOOD
E12.003	E64	102.703	0.014	0.000	0.63	0.0	41.9	SURCHARGED
E11.006	E51	102.388	0.583	0.000	0.70	0.0	178.9	SURCHARGED
E11.007	E52	100.779	2.204	29.563	2.14	0.0	314.1	FLOOD
E11.008	E53	99.561	1.446	0.000	1.18	0.0	323.5	SURCHARGED
E11.009	E54	97.859	1.178	0.000	0.86	0.0	358.6	FLOOD RISK

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E11.010	E55	97.792	1.272	2.606	0.45	0.0	400.8	FLOOD
E13.000	E65	102.713	-0.006	0.000	0.03	0.0	2.9	OK
E13.001	E66	102.722	0.935	0.000	0.89	0.0	91.1	FLOOD RISK
E13.002	E67	101.871	1.114	41.021	1.00	0.0	89.1	FLOOD
E13.003	E68	100.168	1.043	58.364	0.83	0.0	138.0	FLOOD
E13.004	E69	99.050	1.645	150.807	2.95	0.0	256.1	FLOOD
E13.005	E70	98.262	1.057	12.279	1.09	0.0	270.7	FLOOD
E11.011	E56	97.722	2.012	0.000	1.55	0.0	962.8	FLOOD RISK
E11.012	E57	96.770	1.460	0.207	1.20	0.0	1188.7	FLOOD
E11.013	E58	94.768	0.868	128.377	1.02	0.0	1243.5	FLOOD
E11.014	E59	93.332	0.872	174.054	0.89	0.0	1089.1	FLOOD
E11.015	E60	92.280	1.210	169.986	0.98	0.0	1042.6	FLOOD
E11.016	E99	91.584	1.574	535.993	1.17	0.0	647.9	FLOOD
E11.017	E70	90.507	1.327	287.139	1.40	0.0	580.3	FLOOD
E1.012	E13	90.214	1.194	3.545	1.61	0.0	1016.9	FLOOD
E14.000	E73	100.040	1.431	19.559	1.12	0.0	98.1	FLOOD
E14.001	E74	99.034	1.255	74.175	2.47	0.0	201.8	FLOOD
E14.002	E75	98.248	0.599	0.000	0.74	0.0	201.6	SURCHARGED
E14.003	E76	97.659	1.124	79.433	1.51	0.0	201.3	FLOOD
E14.004	E77	96.414	0.589	0.000	0.90	0.0	181.5	SURCHARGED
E14.005	E78	95.670	0.845	0.000	0.95	0.0	181.5	FLOOD RISK
E14.006	E79	94.660	1.045	0.009	0.98	0.0	203.9	FLOOD
E15.000	E85	101.819	1.170	49.019	1.00	0.0	99.9	FLOOD
E15.001	E86	100.542	1.193	71.584	1.13	0.0	113.2	FLOOD
E15.002	E87	98.811	1.122	0.957	0.99	0.0	105.6	FLOOD
E15.003	E88	97.727	1.278	0.000	1.33	0.0	102.5	SURCHARGED
E15.004	E89	96.169	0.660	0.000	1.04	0.0	102.7	SURCHARGED
E15.005	E90	94.120	0.735	0.000	0.83	0.0	178.5	SURCHARGED
E14.007	E80	93.436	1.241	197.108	1.27	0.0	209.3	FLOOD
E14.008	E81	92.775	1.004	35.277	1.51	0.0	247.7	FLOOD
E14.009	E82	92.312	0.791	0.000	0.86	0.0	240.9	SURCHARGED
E14.010	E100	91.528	1.307	337.932	2.72	0.0	303.6	FLOOD
E14.011	E83	91.406	1.226	216.181	1.59	0.0	340.0	FLOOD
E14.012	E84	91.562	1.739	272.169	1.52	0.0	616.2	FLOOD
E1.013	E14	89.886	1.014	0.000	1.05	0.0	1551.9	FLOOD RISK
E1.014	E15	88.223	1.231	733.008	1.18	0.0	1336.6	FLOOD
E16.000	E91	91.552	-0.273	0.000	0.03	0.0	5.4	OK
E16.001	E92	91.409	0.549	0.000	0.14	0.0	23.3	SURCHARGED
E16.002	E93	91.407	1.257	57.335	1.12	0.0	613.1	FLOOD
E16.003	E94	89.571	1.023	0.000	1.44	0.0	595.8	FLOOD RISK
E16.004	E95	88.587	0.539	0.000	0.80	0.0	594.5	SURCHARGED
E1.015	E16	87.622	1.179	0.000	1.59	0.0	1455.9	SURCHARGED
E17.000	E99	90.530	-0.152	0.000	0.00	0.0	0.0	OK

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E17.001	E100	87.737	-0.533	0.000	0.00	0.0	0.0	OK
E1.016	E99	86.807	0.684	0.000	2.31	0.0	1456.5	SURCHARGED

Summary of Critical Results by Maximum Level (Rank 1) for Existing

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360
Return Period(s) (years)	30
Climate Change (%)	0

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
E1.000	15 Summer	30	0%	30/15 Summer				
E1.001	15 Summer	30	0%	30/15 Summer				
E2.000	360 Winter	30	0%	30/120 Summer				
E2.001	360 Summer	30	0%	30/60 Summer				
E1.002	15 Summer	30	0%					
E3.000	15 Winter	30	0%	30/15 Winter				
E3.001	15 Winter	30	0%	30/15 Summer				
E1.003	15 Summer	30	0%					
E4.000	360 Winter	30	0%	30/30 Winter				
E4.001	360 Winter	30	0%	30/15 Summer				
E5.000	15 Winter	30	0%					
E5.001	15 Summer	30	0%					
E4.002	120 Summer	30	0%	30/15 Summer				
E4.003	120 Summer	30	0%	30/15 Summer				
E1.004	15 Summer	30	0%					
E6.000	15 Summer	30	0%					
E6.001	15 Winter	30	0%	30/15 Summer				
E1.005	15 Winter	30	0%	30/15 Summer				
E1.006	15 Winter	30	0%	30/15 Summer	30/15 Summer			4
E7.000	15 Winter	30	0%	30/15 Summer				
E1.007	15 Winter	30	0%	30/15 Summer	30/15 Summer			5
E8.000	15 Summer	30	0%					
E8.001	360 Winter	30	0%					
E9.000	180 Winter	30	0%	30/60 Summer				
E9.001	180 Winter	30	0%	30/15 Summer				
E10.000	15 Summer	30	0%	30/15 Summer				
E10.001	120 Winter	30	0%	30/15 Summer				
E11.000	15 Winter	30	0%					
E10.002	15 Winter	30	0%	30/15 Summer				
E10.003	15 Winter	30	0%					
E10.004	15 Winter	30	0%					
E9.002	15 Winter	30	0%					
E12.000	15 Summer	30	0%					
E12.001	15 Winter	30	0%	30/15 Summer				
E9.003	15 Winter	30	0%					
E8.002	30 Winter	30	0%					
E8.003	60 Winter	30	0%	30/15 Summer				
E1.008	15 Winter	30	0%	30/15 Summer				
E1.009	15 Winter	30	0%	30/15 Summer				

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E1.000	E1	106.673	0.423	0.000	1.09	0.0	419.3	FLOOD RISK
E1.001	E2	106.049	0.261	0.000	1.34	0.0	425.2	SURCHARGED
E2.000	E2	106.260	0.120	0.000	0.02	0.0	5.6	SURCHARGED
E2.001	E3	106.257	0.684	0.000	0.02	0.0	5.6	SURCHARGED
E1.002	E2	105.102	-0.298	0.000	0.39	0.0	434.0	OK
E3.000	E4	104.549	0.074	0.000	0.17	0.0	32.7	SURCHARGED
E3.001	E5	104.540	0.665	0.000	0.03	0.0	10.4	SURCHARGED
E1.003	E3	103.018	-0.257	0.000	0.52	0.0	483.1	OK
E4.000	E8	102.907	0.590	0.000	0.02	0.0	0.7	SURCHARGED
E4.001	E7	102.952	0.702	0.000	0.02	0.0	5.2	SURCHARGED
E5.000	E10	106.078	-0.147	0.000	0.26	0.0	35.9	OK
E5.001	E8	104.406	-0.119	0.000	0.43	0.0	57.4	OK
E4.002	E8	103.049	1.224	0.000	0.17	0.0	35.3	SURCHARGED
E4.003	E9	103.139	1.614	0.000	0.06	0.0	20.3	SURCHARGED
E1.004	E4	100.960	-0.140	0.000	0.57	0.0	454.5	OK
E6.000	E11	100.850	-0.375	0.000	0.16	0.0	69.6	OK
E6.001	E12	100.671	0.596	0.000	0.04	0.0	21.8	SURCHARGED
E1.005	E5	100.515	1.090	0.000	0.53	0.0	445.9	SURCHARGED
E1.006	E16	100.028	2.533	28.237	1.32	0.0	333.9	FLOOD
E7.000	E15	100.871	0.790	0.000	0.81	0.0	229.1	SURCHARGED
E1.007	E6	99.377	2.271	77.174	1.17	0.0	404.4	FLOOD
E8.000	E17	99.454	-0.146	0.000	0.51	0.0	104.9	OK
E8.001	E18	96.456	-0.044	0.000	0.01	0.0	1.1	OK
E9.000	E24	100.979	0.129	0.000	0.06	0.0	16.2	SURCHARGED
E9.001	E25	100.970	0.795	0.000	0.03	0.0	13.2	SURCHARGED
E10.000	E19	103.444	0.019	0.000	1.03	0.0	76.5	SURCHARGED
E10.001	E20	103.262	0.237	0.000	0.02	0.0	2.2	SURCHARGED
E11.000	E21	102.897	-0.103	0.000	0.17	0.0	31.1	OK
E10.002	E21	102.881	1.081	0.000	0.07	0.0	19.7	SURCHARGED
E10.003	E22	100.689	-0.211	0.000	0.08	0.0	25.3	OK
E10.004	E26	99.393	-0.307	0.000	0.21	0.0	38.0	OK
E9.002	E23	99.256	-0.344	0.000	0.12	0.0	66.7	OK
E12.000	E28	99.109	-0.341	0.000	0.13	0.0	50.0	OK
E12.001	E29	98.420	0.168	0.000	0.08	0.0	27.0	SURCHARGED
E9.003	E24	97.508	-0.417	0.000	0.09	0.0	94.6	OK
E8.002	E19	95.677	-0.348	0.000	0.10	0.0	89.0	OK
E8.003	E20	95.660	1.729	0.000	0.24	0.0	72.3	SURCHARGED
E1.008	E7	94.946	1.565	0.000	1.41	0.0	433.2	SURCHARGED
E1.009	E35	93.362	0.781	0.000	1.40	0.0	433.2	SURCHARGED

Time Area Diagram for Existing

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	2.280	4-8	0.364	8-12	0.000

Total Area Contributing (ha) = 2.644

Total Pipe Volume (m^3) = 236.891

Existing Network Details for Existing

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
E1.000	13.634	0.462	29.5	0.711	2.00	0.0	0.600	o	450
E1.001	13.634	0.318	42.9	0.000	0.00	0.0	0.600	o	450
E2.000	87.870	0.567	155.0	0.000	2.00	5.6	0.600	o	450
E2.001	20.506	0.248	82.7	0.000	0.00	0.0	0.600	o	450
E1.002	24.482	2.125	11.5	0.000	0.00	1.4	0.600	o	525
E3.000	56.476	0.600	94.1	0.042	2.00	7.0	0.600	o	375
E3.001	18.940	0.675	28.1	0.000	0.00	0.0	0.600	o	375
E1.003	44.535	2.100	21.2	0.073	0.00	2.8	0.600	o	525
E4.000	10.000	0.067	149.3	0.086	5.00	0.0	0.600	o	225
E4.001	59.070	0.400	147.7	0.043	2.00	5.6	0.600	o	450
E5.000	20.000	1.700	11.8	0.069	5.00	0.0	0.600	o	225
E5.001	37.940	2.700	14.1	0.030	2.00	5.6	0.600	o	225
E4.002	65.295	0.300	217.7	0.062	0.00	7.0	0.600	o	450

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Vel (m/s)	Cap (l/s)
E1.000	105.800	0.711	0.0	3.75	597.0
E1.001	105.338	0.711	0.0	3.11	494.9
E2.000	105.690	0.000	5.6	1.63	259.4
E2.001	105.123	0.000	5.6	2.24	355.8
E1.002	104.875	0.711	7.0	6.62	1434.1
E3.000	104.100	0.042	7.0	1.87	206.3
E3.001	103.500	0.042	7.0	3.43	379.1
E1.003	102.750	0.826	16.8	4.88	1056.3
E4.000	102.092	0.086	0.0	1.07	42.5
E4.001	101.800	0.129	5.6	1.67	265.7
E5.000	106.000	0.069	0.0	3.84	152.5
E5.001	104.300	0.099	5.6	3.51	139.5
E4.002	101.375	0.290	18.2	1.37	218.5

Existing Network Details for Existing

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
E4.003	16.292	0.425	38.3	0.000	0.00	0.0	0.600	o	450
E1.004	46.673	1.600	29.2	0.047	0.00	7.0	0.600	o	525
E6.000	127.913	1.150	111.2	0.090	2.00	16.8	0.600	o	525
E6.001	16.281	0.650	25.0	0.000	0.00	0.0	0.600	o	525
E1.005	45.880	1.786	25.7	0.053	0.00	5.6	0.600	o	525
E1.006	10.000	0.389	25.7	0.000	0.00	0.0	0.600	o	381
E7.000	155.705	2.975	52.3	0.527	2.00	7.0	0.600	o	381
E1.007	127.659	3.725	34.3	0.189	0.00	5.6	0.600	o	381
E8.000	84.835	3.100	27.4	0.153	2.00	0.0	0.600	o	300
E8.001	9.846	0.475	20.7	0.000	0.00	0.0	0.600	o	300
E9.000	76.751	0.675	113.7	0.052	2.00	11.2	0.600	o	450
E9.001	12.164	0.475	25.6	0.000	0.00	0.0	0.600	o	450

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Vel (m/s)	Cap (l/s)
E4.003	101.075	0.290	18.2	3.29	523.5
E1.004	100.575	1.163	42.0	4.16	900.2
E6.000	100.700	0.090	16.8	2.12	459.6
E6.001	99.550	0.090	16.8	4.49	971.7
E1.005	98.900	1.306	64.4	4.43	959.5
E1.006	97.114	1.306	64.4	3.62	413.0
E7.000	99.700	0.527	7.0	2.53	289.0
E1.007	96.725	2.022	77.0	3.14	357.5
E8.000	99.300	0.153	0.0	3.02	213.3
E8.001	96.200	0.153	0.0	3.47	245.2
E9.000	100.400	0.052	11.2	1.91	303.1
E9.001	99.725	0.052	11.2	4.03	641.0

Existing Network Details for Existing

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
E10.000	15.264	0.400	38.2	0.155	2.00	0.0	0.600	o	225
E10.001	39.332	1.225	32.1	0.000	0.00	0.0	0.600	o	225
E11.000	37.389	1.200	31.2	0.041	2.00	5.6	0.600	o	300
E10.002	33.811	0.900	37.6	0.041	0.00	1.4	0.600	o	375
E10.003	46.007	1.200	38.3	0.000	0.00	5.6	0.600	o	375
E10.004	9.731	0.100	97.3	0.028	0.00	0.0	0.600	o	450
E9.002	50.352	1.675	30.1	0.028	0.00	4.2	0.600	o	450
E12.000	75.107	1.198	62.7	0.057	2.00	11.2	0.600	o	450
E12.001	14.054	0.327	43.0	0.000	0.00	0.0	0.600	o	450
E9.003	31.000	1.900	16.3	0.000	0.00	1.4	0.600	o	525
E8.002	42.353	1.950	21.7	0.067	0.00	0.0	0.600	o	525
E8.003	14.134	0.550	25.7	0.000	0.00	0.0	0.600	o	381
E1.008	28.341	0.800	35.4	0.000	0.00	0.0	0.600	o	381

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Vel (m/s)	Cap (l/s)
E10.000	103.200	0.155	0.0	2.12	84.5
E10.001	102.800	0.155	0.0	2.32	92.1
E11.000	102.700	0.041	5.6	2.83	199.8
E10.002	101.425	0.237	7.0	2.96	327.4
E10.003	100.525	0.237	12.6	2.93	324.1
E10.004	99.250	0.265	12.6	2.06	327.8
E9.002	99.150	0.345	28.0	3.72	591.5
E12.000	99.000	0.057	11.2	2.57	408.9
E12.001	97.802	0.057	11.2	3.11	494.3
E9.003	97.400	0.402	40.6	5.56	1204.6
E8.002	95.500	0.622	40.6	4.82	1043.7
E8.003	93.550	0.622	40.6	3.62	413.0
E1.008	93.000	2.644	117.6	3.08	351.6

Existing Network Details for Existing

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
E1.009	29.464	0.832	35.4	0.000	0.00	0.0	0.600	o	381

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Vel (m/s)	Cap (l/s)
E1.009	92.200	2.644	117.6	3.08	351.6

Free Flowing Outfall Details for Existing

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
E1.009	E	95.200	91.368	91.368	0	0

Simulation Criteria for Existing

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	22
Number of Online Controls	12	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
Site Location	487000 152100 SU 87000 52100
C (1km)	-0.025
D1 (1km)	0.301
D2 (1km)	0.275
D3 (1km)	0.307
E (1km)	0.300
F (1km)	2.648
Summer Storms	Yes
Winter Storms	No
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Online Controls for Existing

Hydro-Brake® Manhole: E3, DS/PN: E2.001, Volume (m³): 16.4

Design Head (m)	0.942	Diameter (mm)	96
Design Flow (l/s)	5.0	Invert Level (m)	105.123
Hydro-Brake® Type	Md6 SW Only		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.9	1.200	5.8	3.000	9.1	7.000	13.9
0.200	4.3	1.400	6.2	3.500	9.8	7.500	14.4
0.300	4.1	1.600	6.7	4.000	10.5	8.000	14.9
0.400	4.0	1.800	7.1	4.500	11.2	8.500	15.3
0.500	4.0	2.000	7.4	5.000	11.8	9.000	15.8
0.600	4.2	2.200	7.8	5.500	12.3	9.500	16.2
0.800	4.7	2.400	8.1	6.000	12.9		
1.000	5.3	2.600	8.5	6.500	13.4		

Hydro-Brake® Manhole: E5, DS/PN: E3.001, Volume (m³): 9.0

Design Head (m)	0.975	Diameter (mm)	133
Design Flow (l/s)	10.0	Invert Level (m)	103.500
Hydro-Brake® Type	Md6 SW Only		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.3	1.200	11.1	3.000	17.5	7.000	26.7
0.200	9.0	1.400	12.0	3.500	18.9	7.500	27.6
0.300	9.7	1.600	12.8	4.000	20.2	8.000	28.5
0.400	9.4	1.800	13.5	4.500	21.4	8.500	29.4
0.500	9.0	2.000	14.3	5.000	22.6	9.000	30.3
0.600	8.9	2.200	15.0	5.500	23.7	9.500	31.1
0.800	9.4	2.400	15.6	6.000	24.7		
1.000	10.2	2.600	16.3	6.500	25.7		

Hydro-Brake® Manhole: E7, DS/PN: E4.001, Volume (m³): 2.9

Design Head (m)	1.292	Diameter (mm)	104
Design Flow (l/s)	7.0	Invert Level (m)	101.800
Hydro-Brake® Type	Md6 SW Only		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.2	1.000	6.2	2.400	9.6	5.500	14.5
0.200	5.2	1.200	6.8	2.600	10.0	6.000	15.1
0.300	5.1	1.400	7.3	3.000	10.7	6.500	15.7
0.400	4.9	1.600	7.8	3.500	11.5	7.000	16.3
0.500	4.9	1.800	8.3	4.000	12.3	7.500	16.9
0.600	5.0	2.000	8.7	4.500	13.1	8.000	17.5
0.800	5.6	2.200	9.2	5.000	13.8	8.500	18.0

Hydro-Brake® Manhole: E7, DS/PN: E4.001, Volume (m³): 2.9

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
9.000	18.5	9.500	19.0

Hydro-Brake® Manhole: E9, DS/PN: E4.003, Volume (m³): 13.9

Design Head (m)	1.172	Diameter (mm)	160
Design Flow (l/s)	16.0	Invert Level (m)	101.075
Hydro-Brake® Type	Md6 SW Only		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.3	1.200	16.2	3.000	25.3	7.000	38.6
0.200	12.4	1.400	17.4	3.500	27.3	7.500	40.0
0.300	15.3	1.600	18.5	4.000	29.2	8.000	41.3
0.400	15.4	1.800	19.6	4.500	31.0	8.500	42.6
0.500	14.8	2.000	20.7	5.000	32.7	9.000	43.8
0.600	14.4	2.200	21.7	5.500	34.3	9.500	45.0
0.800	14.3	2.400	22.6	6.000	35.8		
1.000	15.1	2.600	23.6	6.500	37.2		

Hydro-Brake® Manhole: E12, DS/PN: E6.001, Volume (m³): 30.5

Design Head (m)	1.675	Diameter (mm)	184
Design Flow (l/s)	25.0	Invert Level (m)	99.550
Hydro-Brake® Type	Md6 SW Only		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.1	1.200	21.7	3.000	33.5	7.000	51.1
0.200	15.3	1.400	23.1	3.500	36.1	7.500	52.9
0.300	20.9	1.600	24.5	4.000	38.6	8.000	54.6
0.400	21.9	1.800	26.0	4.500	41.0	8.500	56.3
0.500	21.6	2.000	27.3	5.000	43.2	9.000	57.9
0.600	20.9	2.200	28.7	5.500	45.3	9.500	59.5
0.800	20.1	2.400	29.9	6.000	47.3		
1.000	20.6	2.600	31.1	6.500	49.2		

Hydro-Brake® Manhole: E18, DS/PN: E8.001, Volume (m³): 8.5

Design Head (m)	3.100	Diameter (mm)	55
Design Flow (l/s)	3.0	Invert Level (m)	96.200
Hydro-Brake® Type	Md6 SW Only		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.1	0.500	1.2	1.200	1.9	2.000	2.4
0.200	1.0	0.600	1.3	1.400	2.0	2.200	2.6
0.300	1.0	0.800	1.5	1.600	2.2	2.400	2.7
0.400	1.1	1.000	1.7	1.800	2.3	2.600	2.8

Hydro-Brake® Manhole: E18, DS/PN: E8.001, Volume (m³): 8.5

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
3.000	3.0	5.000	3.9	7.000	4.6	9.000	5.2
3.500	3.2	5.500	4.0	7.500	4.7	9.500	5.3
4.000	3.5	6.000	4.2	8.000	4.9		
4.500	3.7	6.500	4.4	8.500	5.0		

Hydro-Brake® Manhole: E25, DS/PN: E9.001, Volume (m³): 14.7

Design Head (m)	0.675	Diameter (mm)	140
Design Flow (l/s)	10.0	Invert Level (m)	99.725
Hydro-Brake® Type	Md5 SW Only		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.6	1.200	12.9	3.000	20.4	7.000	31.2
0.200	8.5	1.400	14.0	3.500	22.1	7.500	32.3
0.300	9.2	1.600	14.9	4.000	23.6	8.000	33.4
0.400	9.1	1.800	15.8	4.500	25.0	8.500	34.4
0.500	9.2	2.000	16.7	5.000	26.4	9.000	35.4
0.600	9.5	2.200	17.5	5.500	27.7	9.500	36.4
0.800	10.6	2.400	18.3	6.000	28.9		
1.000	11.8	2.600	19.0	6.500	30.1		

Hydro-Brake® Manhole: E20, DS/PN: E10.001, Volume (m³): 3.1

Design Head (m)	1.000	Diameter (mm)	73
Design Flow (l/s)	3.0	Invert Level (m)	102.800
Hydro-Brake® Type	Md6 SW Only		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.9	1.200	3.3	3.000	5.3	7.000	8.0
0.200	2.1	1.400	3.6	3.500	5.7	7.500	8.3
0.300	2.0	1.600	3.8	4.000	6.1	8.000	8.6
0.400	2.0	1.800	4.1	4.500	6.4	8.500	8.9
0.500	2.2	2.000	4.3	5.000	6.8	9.000	9.1
0.600	2.4	2.200	4.5	5.500	7.1	9.500	9.4
0.800	2.7	2.400	4.7	6.000	7.4		
1.000	3.0	2.600	4.9	6.500	7.8		

Hydro-Brake® Manhole: E21, DS/PN: E10.002, Volume (m³): 7.0

Design Head (m)	1.500	Diameter (mm)	169
Design Flow (l/s)	20.0	Invert Level (m)	101.425
Hydro-Brake® Type	Md6 SW Only		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.6	0.200	13.5	0.300	17.3	0.400	17.7

Hydro-Brake® Manhole: E21, DS/PN: E10.002, Volume (m³): 7.0

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.500	17.2	1.800	21.9	4.000	32.6	7.500	44.6
0.600	16.6	2.000	23.1	4.500	34.6	8.000	46.1
0.800	16.3	2.200	24.2	5.000	36.4	8.500	47.5
1.000	17.0	2.400	25.2	5.500	38.2	9.000	48.9
1.200	18.1	2.600	26.3	6.000	39.9	9.500	50.2
1.400	19.4	3.000	28.2	6.500	41.5		
1.600	20.7	3.500	30.5	7.000	43.1		

Hydro-Brake® Manhole: E22, DS/PN: E10.003, Volume (m³): 6.6

Design Head (m) 1.275 Hydro-Brake® Type Md2 Invert Level (m) 100.525
Design Flow (l/s) 150.0 Diameter (mm) 356

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	9.4	1.200	145.6	3.000	229.1	7.000	350.0
0.200	36.4	1.400	156.6	3.500	247.5	7.500	362.2
0.300	72.0	1.600	167.3	4.000	264.5	8.000	374.1
0.400	105.8	1.800	177.5	4.500	280.6	8.500	385.6
0.500	128.6	2.000	187.1	5.000	295.8	9.000	396.8
0.600	141.5	2.200	196.2	5.500	310.2	9.500	407.7
0.800	138.2	2.400	204.9	6.000	324.0		
1.000	136.4	2.600	213.3	6.500	337.2		

Hydro-Brake® Manhole: E29, DS/PN: E12.001, Volume (m³): 14.6

Design Head (m) 1.648 Diameter (mm) 202
Design Flow (l/s) 30.0 Invert Level (m) 97.802
Hydro-Brake® Type Md6 SW Only

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.7	1.200	26.6	3.000	40.3	7.000	61.6
0.200	17.4	1.400	28.1	3.500	43.6	7.500	63.8
0.300	25.3	1.600	29.7	4.000	46.6	8.000	65.8
0.400	27.5	1.800	31.3	4.500	49.4	8.500	67.9
0.500	27.5	2.000	33.0	5.000	52.1	9.000	69.8
0.600	26.9	2.200	34.6	5.500	54.6	9.500	71.8
0.800	25.5	2.400	36.1	6.000	57.0		
1.000	25.6	2.600	37.5	6.500	59.4		

Hydro-Brake® Manhole: E20, DS/PN: E8.003, Volume (m³): 16.4

Design Head (m) 1.950 Diameter (mm) 288
Design Flow (l/s) 70.0 Invert Level (m) 93.550
Hydro-Brake® Type Md5 SW Only

Hydro-Brake® Manhole: E20, DS/PN: E8.003, Volume (m³): 16.4

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	10.4	0.200	27.1	0.300	42.1	0.400	50.8

Hydro-Brake® Manhole: E20, DS/PN: E8.003, Volume (m³): 16.4

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.500	54.8	1.800	67.3	4.000	99.8	7.500	136.7
0.600	55.9	2.000	70.7	4.500	105.9	8.000	141.2
0.800	55.2	2.200	74.1	5.000	111.6	8.500	145.5
1.000	55.5	2.400	77.4	5.500	117.1	9.000	149.8
1.200	57.5	2.600	80.5	6.000	122.3	9.500	153.9
1.400	60.4	3.000	86.5	6.500	127.3		
1.600	63.8	3.500	93.4	7.000	132.1		

Storage Structures for Existing

Porous Car Park Manhole: E5, DS/PN: E3.001

Infiltration Coefficient Base (m/hr)	0.00655	Width (m)	5.2
Membrane Percolation (mm/hr)	1000	Length (m)	80.0
Max Percolation (l/s)	115.6	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	104.850	Cap Volume Depth (m)	0.000

Porous Car Park Manhole: E3, DS/PN: E1.003

Infiltration Coefficient Base (m/hr)	0.00655	Width (m)	6.2
Membrane Percolation (mm/hr)	1000	Length (m)	70.0
Max Percolation (l/s)	120.6	Slope (1:X)	50.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	102.750	Cap Volume Depth (m)	0.000

Cellular Storage Manhole: E8, DS/PN: E4.000

Invert Level (m)	102.092	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00655	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00655		

Depth (m)	**Area (m²)**	**Inf. Area (m²)**	**Depth (m)**	**Area (m²)**	**Inf. Area (m²)**
0.000	225.0	225.0	1.300	0.0	288.0
0.100	225.0	231.0	1.400	0.0	288.0
0.200	225.0	237.0	1.500	0.0	288.0
0.300	225.0	243.0	1.600	0.0	288.0
0.400	225.0	249.0	1.700	0.0	288.0
0.500	225.0	255.0	1.800	0.0	288.0
0.600	225.0	261.0	1.900	0.0	288.0
0.700	225.0	267.0	2.000	0.0	288.0
0.800	225.0	273.0	2.100	0.0	288.0
0.900	225.0	279.0	2.200	0.0	288.0
1.000	225.0	285.0	2.300	0.0	288.0
1.100	0.0	288.0	2.400	0.0	288.0
1.200	0.0	288.0	2.500	0.0	288.0

Porous Car Park Manhole: E7, DS/PN: E4.001

Infiltration Coefficient Base (m/hr)	0.00655	Width (m)	5.9
Membrane Percolation (mm/hr)	1000	Length (m)	61.0
Max Percolation (l/s)	100.0	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	102.950	Cap Volume Depth (m)	0.000

Porous Car Park Manhole: E8, DS/PN: E5.001

Infiltration Coefficient Base (m/hr)	0.00655	Width (m)	5.6
Membrane Percolation (mm/hr)	1000	Length (m)	44.0
Max Percolation (l/s)	68.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	105.150	Cap Volume Depth (m)	0.000

Porous Car Park Manhole: E8, DS/PN: E4.002

Infiltration Coefficient Base (m/hr)	0.00655	Width (m)	5.9
Membrane Percolation (mm/hr)	1000	Length (m)	63.0
Max Percolation (l/s)	103.3	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	102.950	Cap Volume Depth (m)	0.000

Porous Car Park Manhole: E9, DS/PN: E4.003

Infiltration Coefficient Base (m/hr)	0.00655	Width (m)	5.9
Membrane Percolation (mm/hr)	1000	Length (m)	18.0
Max Percolation (l/s)	29.5	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	103.050	Cap Volume Depth (m)	0.000

Porous Car Park Manhole: E4, DS/PN: E1.004

Infiltration Coefficient Base (m/hr)	0.00655	Width (m)	6.4
Membrane Percolation (mm/hr)	1000	Length (m)	47.0
Max Percolation (l/s)	83.6	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.575	Cap Volume Depth (m)	0.000

Porous Car Park Manhole: E11, DS/PN: E6.000

Infiltration Coefficient Base (m/hr)	0.00655	Width (m)	6.2
Membrane Percolation (mm/hr)	1000	Length (m)	126.0
Max Percolation (l/s)	217.0	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	102.050	Cap Volume Depth (m)	0.000

Porous Car Park Manhole: E12, DS/PN: E6.001

Infiltration Coefficient Base (m/hr)	0.00655	Porosity	0.30
Membrane Percolation (mm/hr)	1000	Invert Level (m)	100.650
Max Percolation (l/s)	27.6	Width (m)	6.2
Safety Factor	2.0	Length (m)	16.0

Porous Car Park Manhole: E12, DS/PN: E6.001

Slope (1:X)	0.0	Evaporation (mm/day)	3
Depression Storage (mm)	5	Cap Volume Depth (m)	0.000

Porous Car Park Manhole: E5, DS/PN: E1.005

Infiltration Coefficient Base (m/hr)	0.00655	Width (m)	6.0
Membrane Percolation (mm/hr)	1000	Length (m)	54.0
Max Percolation (l/s)	90.0	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.550	Cap Volume Depth (m)	0.000

Porous Car Park Manhole: E15, DS/PN: E7.000

Infiltration Coefficient Base (m/hr)	0.00655	Width (m)	6.5
Membrane Percolation (mm/hr)	1000	Length (m)	196.0
Max Percolation (l/s)	353.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.850	Cap Volume Depth (m)	0.000

Cellular Storage Manhole: E18, DS/PN: E8.001

Invert Level (m)	96.200	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00655	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00655		

Depth (m)	**Area (m²)**	**Inf. Area (m²)**	**Depth (m)**	**Area (m²)**	**Inf. Area (m²)**
0.000	240.0	0.0	1.300	0.0	0.0
0.100	240.0	0.0	1.400	0.0	0.0
0.200	240.0	0.0	1.500	0.0	0.0
0.300	240.0	0.0	1.600	0.0	0.0
0.400	240.0	0.0	1.700	0.0	0.0
0.500	240.0	0.0	1.800	0.0	0.0
0.600	240.0	0.0	1.900	0.0	0.0
0.700	240.0	0.0	2.000	0.0	0.0
0.800	240.0	0.0	2.100	0.0	0.0
0.900	240.0	0.0	2.200	0.0	0.0
1.000	240.0	0.0	2.300	0.0	0.0
1.100	0.0	0.0	2.400	0.0	0.0
1.200	0.0	0.0	2.500	0.0	0.0

Porous Car Park Manhole: E24, DS/PN: E9.000

Infiltration Coefficient Base (m/hr)	0.00655	Porosity	0.30
Membrane Percolation (mm/hr)	1000	Invert Level (m)	102.050
Max Percolation (l/s)	195.6	Width (m)	8.0
Safety Factor	2.0	Length (m)	88.0

Porous Car Park Manhole: E24, DS/PN: E9.000

Slope (1:X)	0.0	Evaporation (mm/day)	3
Depression Storage (mm)	5	Cap Volume Depth (m)	0.000

Porous Car Park Manhole: E25, DS/PN: E9.001

Infiltration Coefficient Base (m/hr)	0.00655	Width (m)	11.0
Membrane Percolation (mm/hr)	1000	Length (m)	55.0
Max Percolation (l/s)	168.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.950	Cap Volume Depth (m)	0.000

Cellular Storage Manhole: E19, DS/PN: E10.000

Invert Level (m)	103.200	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00655	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00655		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	40.0	40.0	1.300	0.0	66.6
0.100	40.0	42.5	1.400	0.0	66.6
0.200	40.0	45.1	1.500	0.0	66.6
0.300	40.0	47.6	1.600	0.0	66.6
0.400	40.0	50.1	1.700	0.0	66.6
0.500	40.0	52.6	1.800	0.0	66.6
0.600	40.0	55.2	1.900	0.0	66.6
0.700	40.0	57.7	2.000	0.0	66.6
0.800	40.0	60.2	2.100	0.0	66.6
0.900	40.0	62.8	2.200	0.0	66.6
1.000	40.0	65.3	2.300	0.0	66.6
1.100	0.0	66.6	2.400	0.0	66.6
1.200	0.0	66.6	2.500	0.0	66.6

Cellular Storage Manhole: E20, DS/PN: E10.001

Invert Level (m)	102.800	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00655	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00655		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	100.0	100.0	0.800	100.0	132.0
0.100	100.0	104.0	0.900	100.0	136.0
0.200	100.0	108.0	1.000	100.0	140.0
0.300	100.0	112.0	1.100	0.0	142.0
0.400	100.0	116.0	1.200	0.0	142.0
0.500	100.0	120.0	1.300	0.0	142.0
0.600	100.0	124.0	1.400	0.0	142.0
0.700	100.0	128.0	1.500	0.0	142.0

Cellular Storage Manhole: E20, DS/PN: E10.001

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
1.600	0.0	142.0	2.100	0.0	142.0
1.700	0.0	142.0	2.200	0.0	142.0
1.800	0.0	142.0	2.300	0.0	142.0
1.900	0.0	142.0	2.400	0.0	142.0
2.000	0.0	142.0	2.500	0.0	142.0

Porous Car Park Manhole: E21, DS/PN: E11.000

Infiltration Coefficient Base (m/hr)	0.00655	Width (m)	7.3
Membrane Percolation (mm/hr)	1000	Length (m)	53.0
Max Percolation (l/s)	107.5	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	103.550	Cap Volume Depth (m)	0.000

Porous Car Park Manhole: E21, DS/PN: E10.002

Infiltration Coefficient Base (m/hr)	0.00655	Width (m)	7.2
Membrane Percolation (mm/hr)	1000	Length (m)	54.0
Max Percolation (l/s)	108.0	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	102.850	Cap Volume Depth (m)	0.000

Porous Car Park Manhole: E22, DS/PN: E10.003

Infiltration Coefficient Base (m/hr)	0.00655	Width (m)	5.8
Membrane Percolation (mm/hr)	1000	Length (m)	54.0
Max Percolation (l/s)	87.0	Slope (1:X)	46.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.525	Cap Volume Depth (m)	0.000

Porous Car Park Manhole: E28, DS/PN: E12.000

Infiltration Coefficient Base (m/hr)	0.00655	Width (m)	6.8
Membrane Percolation (mm/hr)	1000	Length (m)	87.0
Max Percolation (l/s)	164.3	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.550	Cap Volume Depth (m)	0.000

Cellular Storage Manhole: E19, DS/PN: E8.002

Invert Level (m)	95.500	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00655	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00655		

Cellular Storage Manhole: E19, DS/PN: E8.002

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	300.0	300.0	0.100	300.0	306.9

Cellular Storage Manhole: E19, DS/PN: E8.002

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.200	300.0	313.9	1.400	0.0	393.5
0.300	300.0	320.8	1.500	0.0	393.5
0.400	300.0	327.7	1.600	0.0	393.5
0.500	300.0	334.6	1.700	0.0	393.5
0.600	300.0	341.6	1.800	0.0	393.5
0.700	300.0	348.5	1.900	0.0	393.5
0.800	300.0	355.4	2.000	0.0	393.5
0.900	300.0	362.4	2.100	0.0	393.5
1.000	300.0	369.3	2.200	0.0	393.5
1.100	300.0	376.2	2.300	0.0	393.5
1.200	300.0	383.1	2.400	0.0	393.5
1.300	300.0	390.1	2.500	0.0	393.5

Summary of Critical Results by Maximum Level (Rank 1) for Existing

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360
Return Period(s) (years)	2
Climate Change (%)	0

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
E1.000	15 Summer	2	0%					
E1.001	15 Summer	2	0%					
E2.000	360 Winter	2	0%	2/120 Summer				
E2.001	360 Summer	2	0%	2/60 Summer				
E1.002	15 Summer	2	0%					
E3.000	15 Summer	2	0%					
E3.001	15 Winter	2	0%	2/15 Summer				
E1.003	15 Summer	2	0%					
E4.000	360 Winter	2	0%	2/120 Summer				
E4.001	360 Winter	2	0%	2/15 Summer				
E5.000	15 Winter	2	0%					
E5.001	15 Summer	2	0%					
E4.002	360 Summer	2	0%	2/15 Summer				
E4.003	360 Winter	2	0%	2/15 Summer				
E1.004	15 Summer	2	0%					
E6.000	15 Summer	2	0%					
E6.001	30 Winter	2	0%					
E1.005	15 Summer	2	0%					
E1.006	15 Winter	2	0%	2/15 Summer				
E7.000	15 Summer	2	0%					
E1.007	15 Winter	2	0%	2/15 Summer				
E8.000	15 Summer	2	0%					
E8.001	360 Winter	2	0%					
E9.000	360 Summer	2	0%	2/240 Winter				
E9.001	360 Summer	2	0%	2/15 Summer				
E10.000	15 Summer	2	0%					
E10.001	120 Winter	2	0%					
E11.000	15 Summer	2	0%					
E10.002	30 Winter	2	0%					
E10.003	30 Winter	2	0%					
E10.004	15 Winter	2	0%					
E9.002	15 Winter	2	0%					
E12.000	15 Summer	2	0%					
E12.001	15 Winter	2	0%					
E9.003	15 Winter	2	0%					
E8.002	30 Winter	2	0%					
E8.003	30 Winter	2	0%	2/15 Summer				
E1.008	15 Winter	2	0%	2/15 Summer				
E1.009	15 Winter	2	0%	2/15 Summer				

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E1.000	E1	106.035	-0.215	0.000	0.53	0.0	203.1	OK
E1.001	E2	105.604	-0.184	0.000	0.64	0.0	203.1	OK
E2.000	E2	106.260	0.120	0.000	0.02	0.0	5.6	SURCHARGED
E2.001	E3	106.257	0.684	0.000	0.02	0.0	5.6	SURCHARGED
E1.002	E2	105.029	-0.371	0.000	0.19	0.0	207.0	OK
E3.000	E4	104.178	-0.297	0.000	0.10	0.0	18.6	OK
E3.001	E5	103.913	0.038	0.000	0.03	0.0	9.7	SURCHARGED
E1.003	E3	102.927	-0.348	0.000	0.24	0.0	225.9	OK
E4.000	E8	102.536	0.219	0.000	0.02	0.0	0.7	SURCHARGED
E4.001	E7	102.740	0.490	0.000	0.02	0.0	5.2	SURCHARGED
E5.000	E10	106.049	-0.176	0.000	0.11	0.0	14.6	OK
E5.001	E8	104.371	-0.154	0.000	0.20	0.0	26.2	OK
E4.002	E8	102.650	0.825	0.000	0.10	0.0	20.3	SURCHARGED
E4.003	E9	102.815	1.290	0.000	0.05	0.0	16.8	SURCHARGED
E1.004	E4	100.775	-0.325	0.000	0.29	0.0	231.3	OK
E6.000	E11	100.809	-0.416	0.000	0.08	0.0	32.9	OK
E6.001	E12	99.976	-0.099	0.000	0.03	0.0	21.3	OK
E1.005	E5	99.109	-0.316	0.000	0.32	0.0	272.1	OK
E1.006	E16	97.908	0.413	0.000	0.94	0.0	237.8	SURCHARGED
E7.000	E15	99.903	-0.178	0.000	0.48	0.0	134.0	OK
E1.007	E6	97.592	0.486	0.000	1.00	0.0	347.0	SURCHARGED
E8.000	E17	99.393	-0.207	0.000	0.21	0.0	43.5	OK
E8.001	E18	96.311	-0.189	0.000	0.01	0.0	1.1	OK
E9.000	E24	100.879	0.029	0.000	0.05	0.0	12.8	SURCHARGED
E9.001	E25	100.871	0.696	0.000	0.03	0.0	12.6	SURCHARGED
E10.000	E19	103.315	-0.110	0.000	0.48	0.0	35.6	OK
E10.001	E20	102.984	-0.041	0.000	0.02	0.0	2.2	OK
E11.000	E21	102.761	-0.239	0.000	0.07	0.0	13.4	OK
E10.002	E21	101.779	-0.021	0.000	0.06	0.0	17.7	OK
E10.003	E22	100.682	-0.218	0.000	0.08	0.0	23.2	OK
E10.004	E26	99.366	-0.334	0.000	0.15	0.0	26.7	OK
E9.002	E23	99.236	-0.364	0.000	0.08	0.0	44.0	OK
E12.000	E28	99.079	-0.371	0.000	0.06	0.0	21.6	OK
E12.001	E29	98.037	-0.215	0.000	0.06	0.0	20.8	OK
E9.003	E24	97.487	-0.438	0.000	0.06	0.0	65.5	OK
E8.002	E19	95.591	-0.434	0.000	0.07	0.0	64.7	OK
E8.003	E20	94.770	0.839	0.000	0.19	0.0	57.7	SURCHARGED
E1.008	E7	94.064	0.683	0.000	1.20	0.0	368.9	SURCHARGED
E1.009	E35	92.909	0.328	0.000	1.19	0.0	368.4	SURCHARGED

Summary of Critical Results by Maximum Level (Rank 1) for Existing

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360
Return Period(s) (years)	100
Climate Change (%)	0

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
E1.000	15 Summer	100	0%	100/15 Summer	100/15 Summer			2
E1.001	15 Summer	100	0%	100/15 Summer				
E2.000	360 Summer	100	0%	100/120 Summer				
E2.001	360 Summer	100	0%	100/60 Summer				
E1.002	15 Summer	100	0%					
E3.000	15 Winter	100	0%	100/15 Summer				
E3.001	15 Winter	100	0%	100/15 Summer				
E1.003	15 Summer	100	0%					
E4.000	360 Winter	100	0%	100/15 Summer				
E4.001	360 Winter	100	0%	100/15 Summer				
E5.000	15 Winter	100	0%					
E5.001	15 Summer	100	0%					
E4.002	30 Winter	100	0%	100/15 Summer				
E4.003	30 Winter	100	0%	100/15 Summer				
E1.004	15 Winter	100	0%	100/15 Summer				
E6.000	30 Winter	100	0%					
E6.001	30 Winter	100	0%	100/15 Summer				
E1.005	15 Winter	100	0%	100/15 Summer				
E1.006	15 Winter	100	0%	100/15 Summer	100/15 Summer			6
E7.000	15 Winter	100	0%	100/15 Summer				
E1.007	30 Winter	100	0%	100/15 Summer	100/15 Summer			7
E8.000	15 Summer	100	0%					
E8.001	360 Winter	100	0%	100/60 Winter				
E9.000	180 Winter	100	0%	100/15 Summer				
E9.001	180 Winter	100	0%	100/15 Summer				
E10.000	15 Winter	100	0%	100/15 Summer				
E10.001	120 Winter	100	0%	100/15 Summer				
E11.000	15 Winter	100	0%					
E10.002	15 Winter	100	0%	100/15 Summer				
E10.003	15 Winter	100	0%					
E10.004	15 Winter	100	0%					
E9.002	15 Winter	100	0%					
E12.000	15 Summer	100	0%					
E12.001	15 Winter	100	0%	100/15 Summer				
E9.003	15 Winter	100	0%					
E8.002	60 Winter	100	0%					
E8.003	120 Summer	100	0%	100/15 Summer				
E1.008	30 Winter	100	0%	100/15 Summer				
E1.009	30 Winter	100	0%	100/15 Summer				

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E1.000	E1	106.777	0.527	27.200	1.20	0.0	459.4	FLOOD
E1.001	E2	106.112	0.324	0.000	1.44	0.0	459.3	SURCHARGED
E2.000	E2	106.260	0.120	0.000	0.02	0.0	5.6	SURCHARGED
E2.001	E3	106.257	0.684	0.000	0.02	0.0	5.6	SURCHARGED
E1.002	E2	105.112	-0.288	0.000	0.42	0.0	464.9	OK
E3.000	E4	104.888	0.413	0.000	0.21	0.0	41.3	SURCHARGED
E3.001	E5	104.874	0.999	0.000	0.04	0.0	11.8	SURCHARGED
E1.003	E3	103.037	-0.238	0.000	0.58	0.0	537.6	OK
E4.000	E8	102.934	0.617	0.000	0.02	0.0	0.8	SURCHARGED
E4.001	E7	102.952	0.702	0.000	0.02	0.0	5.2	SURCHARGED
E5.000	E10	106.098	-0.127	0.000	0.39	0.0	53.9	OK
E5.001	E8	104.433	-0.092	0.000	0.63	0.0	83.4	OK
E4.002	E8	103.163	1.338	0.000	0.22	0.0	45.6	SURCHARGED
E4.003	E9	103.150	1.625	0.000	0.06	0.0	21.0	SURCHARGED
E1.004	E4	101.245	0.145	0.000	0.62	0.0	491.7	SURCHARGED
E6.000	E11	100.914	-0.311	0.000	0.15	0.0	66.3	OK
E6.001	E12	100.902	0.827	0.000	0.04	0.0	22.6	SURCHARGED
E1.005	E5	100.655	1.230	0.000	0.58	0.0	491.6	SURCHARGED
E1.006	E16	100.083	2.588	83.091	1.32	0.0	332.8	FLOOD
E7.000	E15	100.977	0.896	0.000	0.83	0.0	234.2	SURCHARGED
E1.007	E6	99.454	2.348	153.672	1.13	0.0	391.5	FLOOD
E8.000	E17	99.500	-0.100	0.000	0.76	0.0	157.3	OK
E8.001	E18	96.565	0.065	0.000	0.01	0.0	1.1	SURCHARGED
E9.000	E24	101.006	0.156	0.000	0.06	0.0	18.2	SURCHARGED
E9.001	E25	100.997	0.822	0.000	0.03	0.0	13.3	SURCHARGED
E10.000	E19	103.633	0.208	0.000	1.21	0.0	89.7	SURCHARGED
E10.001	E20	103.425	0.400	0.000	0.03	0.0	2.4	SURCHARGED
E11.000	E21	102.969	-0.031	0.000	0.23	0.0	42.4	OK
E10.002	E21	102.953	1.153	0.000	0.07	0.0	20.2	SURCHARGED
E10.003	E22	100.691	-0.209	0.000	0.09	0.0	25.8	OK
E10.004	E26	99.409	-0.291	0.000	0.27	0.0	47.8	OK
E9.002	E23	99.270	-0.330	0.000	0.16	0.0	85.0	OK
E12.000	E28	99.130	-0.320	0.000	0.18	0.0	69.8	OK
E12.001	E29	98.904	0.652	0.000	0.08	0.0	26.9	SURCHARGED
E9.003	E24	97.516	-0.409	0.000	0.11	0.0	111.7	OK
E8.002	E19	95.781	-0.244	0.000	0.09	0.0	82.2	OK
E8.003	E20	96.265	2.334	0.000	0.25	0.0	73.6	SURCHARGED
E1.008	E7	94.976	1.595	0.000	1.41	0.0	435.2	SURCHARGED
E1.009	E35	93.377	0.796	0.000	1.41	0.0	435.2	SURCHARGED

Summary of Critical Results by Maximum Level (Rank 1) for Existing

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360
Return Period(s) (years)	100
Climate Change (%)	30

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
E1.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
E1.001	15 Winter	100	+30%	100/15 Summer				
E2.000	360 Summer	100	+30%	100/120 Summer				
E2.001	360 Summer	100	+30%	100/60 Summer				
E1.002	15 Winter	100	+30%					
E3.000	15 Summer	100	+30%	100/15 Summer				
E3.001	15 Winter	100	+30%	100/15 Summer				
E1.003	15 Summer	100	+30%					
E4.000	360 Winter	100	+30%	100/15 Summer				
E4.001	360 Winter	100	+30%	100/15 Summer				
E5.000	15 Winter	100	+30%					
E5.001	15 Winter	100	+30%	100/15 Summer				
E4.002	30 Winter	100	+30%	100/15 Summer				
E4.003	30 Winter	100	+30%	100/15 Summer				
E1.004	15 Winter	100	+30%	100/15 Summer				
E6.000	30 Winter	100	+30%					
E6.001	30 Winter	100	+30%	100/15 Summer				
E1.005	15 Winter	100	+30%	100/15 Summer				
E1.006	15 Winter	100	+30%	100/15 Summer	100/15 Summer			7
E7.000	15 Winter	100	+30%	100/15 Summer				
E1.007	30 Winter	100	+30%	100/15 Summer	100/15 Summer			9
E8.000	15 Summer	100	+30%	100/15 Summer				
E8.001	360 Winter	100	+30%	100/15 Winter				
E9.000	180 Winter	100	+30%	100/15 Summer				
E9.001	180 Winter	100	+30%	100/15 Summer				
E10.000	15 Winter	100	+30%	100/15 Summer				
E10.001	180 Winter	100	+30%	100/15 Summer				
E11.000	15 Winter	100	+30%	100/15 Summer				
E10.002	15 Winter	100	+30%	100/15 Summer				
E10.003	15 Winter	100	+30%					
E10.004	15 Winter	100	+30%					
E9.002	15 Winter	100	+30%					
E12.000	15 Winter	100	+30%					
E12.001	15 Winter	100	+30%	100/15 Summer				
E9.003	15 Winter	100	+30%					
E8.002	60 Winter	100	+30%					
E8.003	120 Winter	100	+30%	100/15 Summer				
E1.008	120 Winter	100	+30%	100/15 Summer				
E1.009	120 Winter	100	+30%	100/15 Summer				

Summary of Critical Results by Maximum Level (Rank 1) for Existing

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
E1.000	E1	106.818	0.568	67.934	1.22	0.0	466.5	FLOOD
E1.001	E2	106.132	0.344	0.000	1.47	0.0	466.4	SURCHARGED
E2.000	E2	106.260	0.120	0.000	0.02	0.0	5.6	SURCHARGED
E2.001	E3	106.257	0.684	0.000	0.02	0.0	5.6	SURCHARGED
E1.002	E2	105.112	-0.288	0.000	0.42	0.0	472.0	OK
E3.000	E4	104.922	0.447	0.000	0.27	0.0	51.4	SURCHARGED
E3.001	E5	104.907	1.032	0.000	0.04	0.0	12.0	SURCHARGED
E1.003	E3	103.046	-0.229	0.000	0.60	0.0	562.0	OK
E4.000	E8	102.990	0.673	0.000	0.00	0.0	0.0	SURCHARGED
E4.001	E7	102.990	0.740	0.000	0.02	0.0	5.2	SURCHARGED
E5.000	E10	106.114	-0.111	0.000	0.51	0.0	70.1	OK
E5.001	E8	104.725	0.200	0.000	0.77	0.0	102.0	SURCHARGED
E4.002	E8	103.286	1.461	0.000	0.23	0.0	45.7	SURCHARGED
E4.003	E9	103.273	1.748	0.000	0.06	0.0	21.7	SURCHARGED
E1.004	E4	101.401	0.301	0.000	0.64	0.0	511.6	SURCHARGED
E6.000	E11	101.144	-0.081	0.000	0.18	0.0	80.9	OK
E6.001	E12	101.133	1.058	0.000	0.04	0.0	23.9	FLOOD RISK
E1.005	E5	100.761	1.336	0.000	0.61	0.0	518.5	SURCHARGED
E1.006	E16	100.132	2.637	132.111	1.32	0.0	332.8	FLOOD
E7.000	E15	101.085	1.004	0.000	0.83	0.0	234.4	SURCHARGED
E1.007	E6	99.532	2.426	232.200	1.14	0.0	392.9	FLOOD
E8.000	E17	99.651	0.051	0.000	0.98	0.0	202.3	SURCHARGED
E8.001	E18	96.688	0.188	0.000	0.01	0.0	1.2	SURCHARGED
E9.000	E24	101.038	0.188	0.000	0.07	0.0	20.2	SURCHARGED
E9.001	E25	101.029	0.854	0.000	0.03	0.0	13.5	SURCHARGED
E10.000	E19	103.840	0.415	0.000	1.35	0.0	100.6	SURCHARGED
E10.001	E20	103.603	0.578	0.000	0.03	0.0	2.7	SURCHARGED
E11.000	E21	103.038	0.038	0.000	0.29	0.0	54.4	SURCHARGED
E10.002	E21	103.021	1.221	0.000	0.07	0.0	20.6	SURCHARGED
E10.003	E22	100.692	-0.208	0.000	0.09	0.0	26.2	OK
E10.004	E26	99.422	-0.278	0.000	0.31	0.0	55.4	OK
E9.002	E23	99.283	-0.317	0.000	0.19	0.0	100.8	OK
E12.000	E28	99.439	-0.011	0.000	0.21	0.0	79.6	OK
E12.001	E29	99.419	1.167	0.000	0.09	0.0	29.8	SURCHARGED
E9.003	E24	97.525	-0.400	0.000	0.13	0.0	127.8	OK
E8.002	E19	95.878	-0.147	0.000	0.09	0.0	84.7	OK
E8.003	E20	97.136	3.205	0.000	0.30	0.0	90.1	SURCHARGED
E1.008	E7	95.580	2.199	0.000	1.49	0.0	457.4	FLOOD RISK
E1.009	E35	93.651	1.070	0.000	1.47	0.0	455.7	SURCHARGED