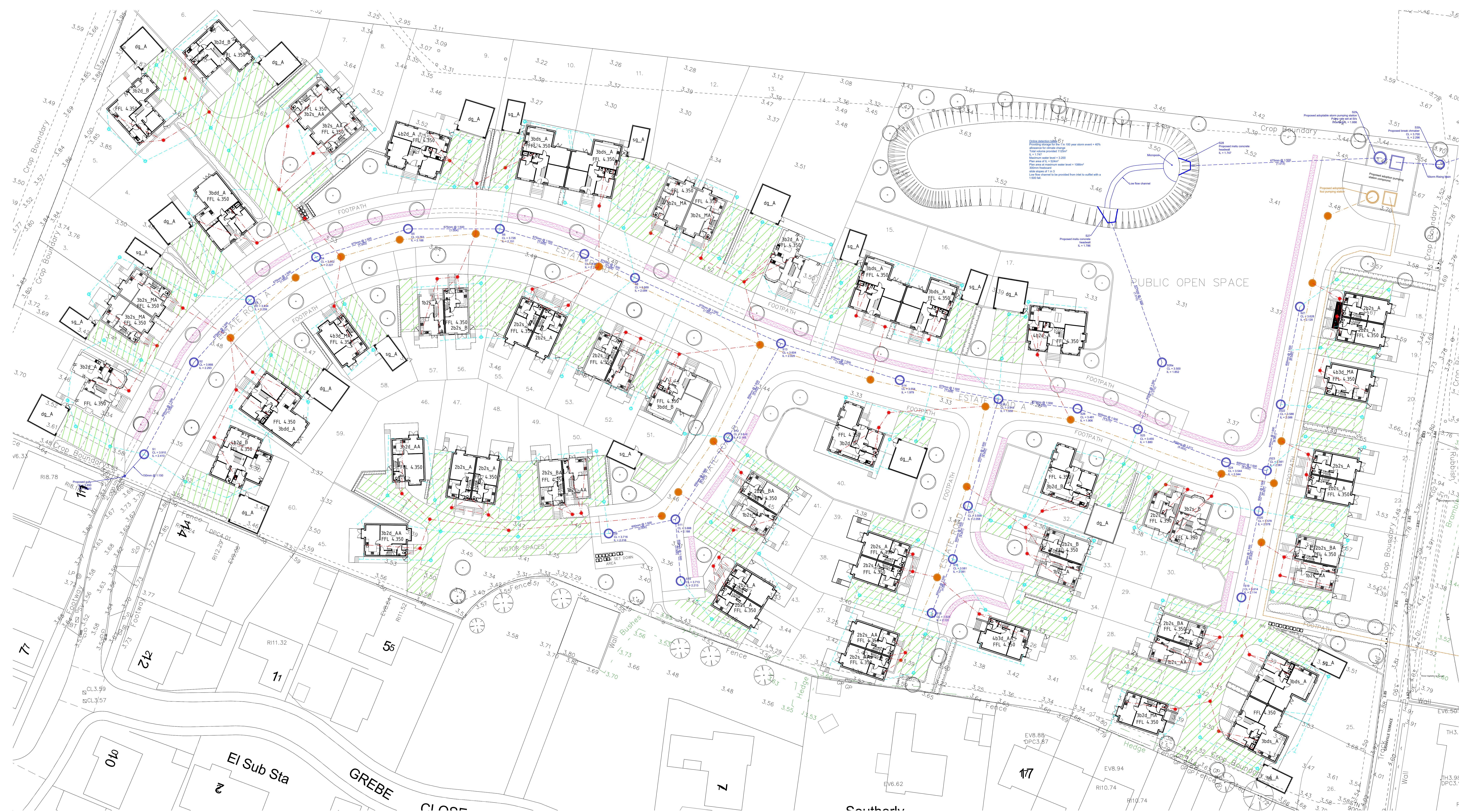




GENERAL

Do not scale from this drawing.

All dimensions are in millimetres unless noted otherwise.

All setting out to architects drawings.

Drawing to be read in conjunction with all other SEA drawings and architects drawings.

This scheme has been designed using the survey information provided by others. It shall be the responsibility of the contractor to verify levels, boundaries etc prior to commencing any works on site. SEA Structural Engineers Ltd. shall not accept any responsibility for errors resulting from the survey.

All setting out of houses and private drives/footpaths to be in accordance with the Architect's drawings, the Contractor is to check all dimensions and levels prior to commencement of work and report any discrepancies to the Engineer, including any encountered during construction works.

All dimensions should be checked on site prior to construction. Please notify the Engineer of any discrepancies before commencing or continuing any work.

HEALTH, SAFETY & THE ENVIRONMENT

In accordance with the Health and Safety at Work etc. Act 1974 and the Construction (Design and Management) Regulations 2015, designs and details on this drawing have been the subject of a Designers Risk Assessment, to identify risks in construction, use, or demolition of the scheme.

It is not considered necessary for Designers to highlight obvious and/or common risks (such as deep excavations, manual handling and working around heavy plant) which Contractors should be familiar with.

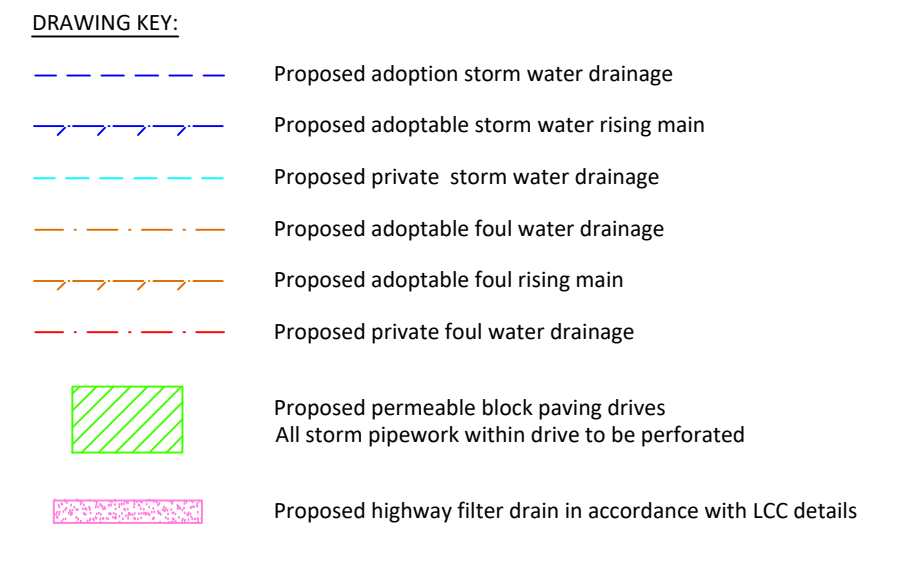
So far as is reasonably practicable, risks inherent in the design have been eliminated. Where it has been considered that elimination of a risk (or part of a risk) is not reasonably practicable, it has been reduced.

Significant unusual residual risks are identified below, beside the measures which have been adopted to eliminate and/or reduce them:

None identified.

GENERAL DRAINAGE NOTES

1. All pipe lengths and gradients are based on centre of manhole to centre of manhole.
2. The exact position, level, size and use of existing sewers to be confirmed on site and reported to the Engineer prior to the commencement of works.
3. All pipes are to be laid with level sufficient to be indicated.
4. All private drainage works to accord with the requirements of building regulations 2010, Part H (drainage and waste disposal).
5. All pipes to be bedded and backfilled in accordance with Part H, diagram 10. Shallow pipes shall be protected in accordance with Part H, diagram 11.
6. Unless otherwise stated, all private drainage to be 100mm diameter. Gradients have been shown where there are pipe capacity issues, however minimum gradients are as below:
Surface water 100mm diameter pipes shall not be laid flatter than 1 in 100.
Foul water 100mm diameter pipes shall not be laid flatter than 1 in 40 unless there is a WC connected upstream at which it can be laid at 1 in 80.
Foul water 150mm diameter pipes shall not be laid flatter than 1 in 150 providing there are minimum of 5 WCs connected.
7. Foul water sewers serving more than 10 dwellings shall have a minimum diameter of 150mm.
8. Pipes which run adjacent to buildings shall be installed in strict accordance with Part H, clauses 2.23 to 2.25 and diagram 8.
9. All drains near existing or proposed trees shall be constructed in accordance with the requirements of NHC's practice note '3' building near trees'.
10. Excavation of drain trenches must not be lower than the foundation of any nearby buildings; if the trench is within 1m of foundations, the trench needs to be filled with concrete up to the lowest level of the foundation. If the trench is further than 1m away from the foundations, the trench needs to be filled with concrete to a level below the lowest level of the building, equal to the distance from the building, less than 150mm.
11. Adequate surface water drainage systems shall be provided to prevent unregulated discharge of water from a private drive onto the highway. These measures shall be implemented before the development is brought into use.
12. Perforated pipework to be used for distributor runs within permeable block paved areas.
13. Trapped road gullies to be used for all gullies designed in shared parking areas.
14. All private manholes and inspection chambers situated in areas subject to vehicular loading to have Class D400 covers and frames. Those not subject to vehicular loading to have class B125 covers and frames all to BS EN 124.
15. All adoptable drainage works to be carried out in accordance with Sewer for Adoption and Anglian Water amendments.



Storm Drainage design Statement

In accordance with the storm drainage hierarchy we have considered use of infiltration techniques, outfall to watercourse and finally outfall to sewers, each presented below:

Outfall to ground (infiltration)

The ground investigation for the development carried out infiltration testing. Results conclude that the use of infiltration techniques are not possible due to low to no permeability and a high water water table.

Outfall to Watercourse

There is an IDB controlled water course to the north east of the development. Discussions with the IDB has confirmed that an outfall to this water course is possible. Flow will be restricted to 5.00 as confirmed by the IDB, attenuation will be provided for all storm events up to and including the 3in100 year event plus a 40% allowance for climate changes by the use of an online detention basin.

Outfall to Sewers

As an outfall to a water course has proven possible the use of existing storm sewers has been discounted. All storm sewers within the main access road will be offered for adoption to Anglian Water.

Urban Creep

We have included a 10% increase of positively drained areas in the calculations in accordance with best practice guidelines.

SUDS

The use of SUDS has been considered for the development. Private drives will be formed in tanked permeable block paving, the main access road will drain via a filter drain located on one side of the carriageway. And finally the use of an online detention basin has been proposed for the sites storm water attenuation. All of which will provide adequate treatment of the developments storm water in accordance with the SUDS manual.

Maintenance Schedules		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly (or as required)
	Inspect filter drain surface, identify and remove any debris or material that could cause blockages, standing water and structural damage	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for all accumulation, and establish appropriate safe removal frequencies	Six monthly
Occasional maintenance	Remove sediment from pre-treatment devices	Six monthly, or as required
	Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods (eg NUGUS, 2007 or BS 3998:2010)	As required
	At locations with high pollution loads, remove surface geotextiles and replace, and wash or replace overlying filter medium	Five yearly, or as required
Monitoring	Clear perforated pipework of blockages	As required

Operation and maintenance requirements for pervious pavements		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations - pay particular attention to areas where water runs off previous surface from adjacent impermeable areas as this area is most likely to collect the most sediment
	Stabilise and mow contributing and adjacent areas	As required
Occasional maintenance	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required - once per year on less frequently used pavements
	Remediate any landmining which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
Remedial Actions	Remedial work to any depressions, ruts and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost paving material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth - if required, take remedial action	Three-monthly, 48 h after large storms in first six months
Monitoring	Inspect for accumulation and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Operation and maintenance requirements for detention basins		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly
	Cut grass - for spillways and access routes	Monthly (during growing season, or as required)
Occasional maintenance	Cut grass - mowdown grass in and around basin	Half yearly (spring - before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
Regular maintenance	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect channels, structures, pipework etc for evidence of physical damage	Monthly
Occasional maintenance	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies	Monthly (for first year), then annually or as required
	Check any pre-treatment and other mechanical devices	Annually
Regular maintenance	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
Occasional maintenance	Manage wetland plants in outlet pool - where provided	Annually (as set out in Chapter 25)
	Revised areas of poor vegetation growth	As required
Remedial actions	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Monitoring	Repair erosion or other damage by reseed or re-turfing	As required
	Revegetation of the site	As required
Monitoring	Revegetation of the site, outlets and overflows	As required
	Relevel uneven surfaces and maintain design levels	As required

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PROJECT
RESIDENTIAL DEVELOPMENT
OFF NIGHTINGALE WAY
SUTTON BRIDGE

DRAWING
PROPOSED DRAINAGE LAYOUT
(1 OF 2)

SCALE: 1:250 @A0 [DATE: 20.11.2019]
DRAWN BY: SEA [REV: A]
STATUS: FOR PLANNING

DWG No: 1886/S/E31 A