-DRAINAGE KEY-

- Existing Public Foul Water Manhole
- Existing Public Foul Water Sewer
- No-Dig Construction Area
- Proposed Foul Water Drain
- Proposed Foul Water Anti-Flood Valve
- Proposed Foul Water Manhole
- Proposed Foul Water Manhole (Brick 700x900mm)
- Proposed Porous Paving
- Proposed Surface Water Drain
- Proposed Surface Water HydroBrake
- Proposed Headwall
- Proposed Surface Water Manhole
- Proposed Surface Water Manhole (Brick 700x900mm)
- Proposed Surface Water Rodding Eye
- Proposed Surface Water Diffuser
- Proposed ACO Drain

-SURFACE WATER STRATEGY-

- Surface water disposal should be managed in view of the SuDS hierarchy;
  1. Infiltration
  2. Watercourse
  3. Public Surface Water Sewer(s)
- A site-specific geotechnical investigation was undertaken by **Ashdown Site Investigation (Report No. R18-12681)** on Thursday 11 January 2018. The objectives of the investigation were to determine shallow ground and groundwater conditions at exploratory hole locations and to provide calculated soil infiltration rates to assist with the design of a sustainable drainage strategy for the site, to comply with the SUDS hierarchy
- Infiltration rates ranged from $6.1x10^{-6}$ to $8.8x10^{-7}$ at the two trial pits across the site
- Groundwater was recorded at depths ranging from 0.95m to 2.00m below ground level at the two boreholes excavated on the site
- In view of the two points above, it is deemed that infiltration methods and techniques are not a viable option in relation to the site
- The driveway and all parking areas of hardstand will be drained through the use of tanked porous paving. This will provide a level of storage, as well as treatment, before being released at a controlled rate to the existing watercourse located to the northern boundary of the site
- Rainwater collected by RWPs, along with surface water run-off generated by all other areas of impermeable hardstand, will also be collected and discharged to the watercourse located to the northern boundary of the site - again at a controlled rate
- The rate of run-off to the watercourse will be restricted to 2.5l/s (the pre-development greenfield run-off rate has been determined to be 1.1l/s)
- An Exemption has been registered with the Environment Agency (EXFRA003472) in relation to this activity ('Outfall pipes less than 300mm diameter through a headwall FRA12')
- The drainage strategy has been designed for 1-in-100 year storm events, with the allowance of 30% for climate change

-FOUL WATER STRATEGY-

- Foul water disposal should adhere to the following hierarchy;
  1. Public Sewer
  2. Private Treatment Plant
  3. Septic Tank and Drainage Field
  4. Cesspool
- A S106 Application will be required in order to connect the new dwellings to the existing public foul water sewer located in Elm Grove, subject to approval from Southern Water, in view of the Water Industry Act 1991
- Levels and gradient of existing public foul water sewer are to be confirmed on site prior to the commencement of any related drainage works
- An anti-flood valve is proposed in relation to the foul water drainage system to mitigate potential flooding as a result of the existing foul water sewer being inundated with surface water and groundwater ingress.
- Further to this, the implementation of oversized manholes is proposed to provide a volume of storage when the anti-flood valve is closed
- Post development, there will be an increase in peak foul water flows to 0.015l/s

Please refer to Architect's plans. All RGP drawings are based upon the following drawings, provided by Knightsgate UK;

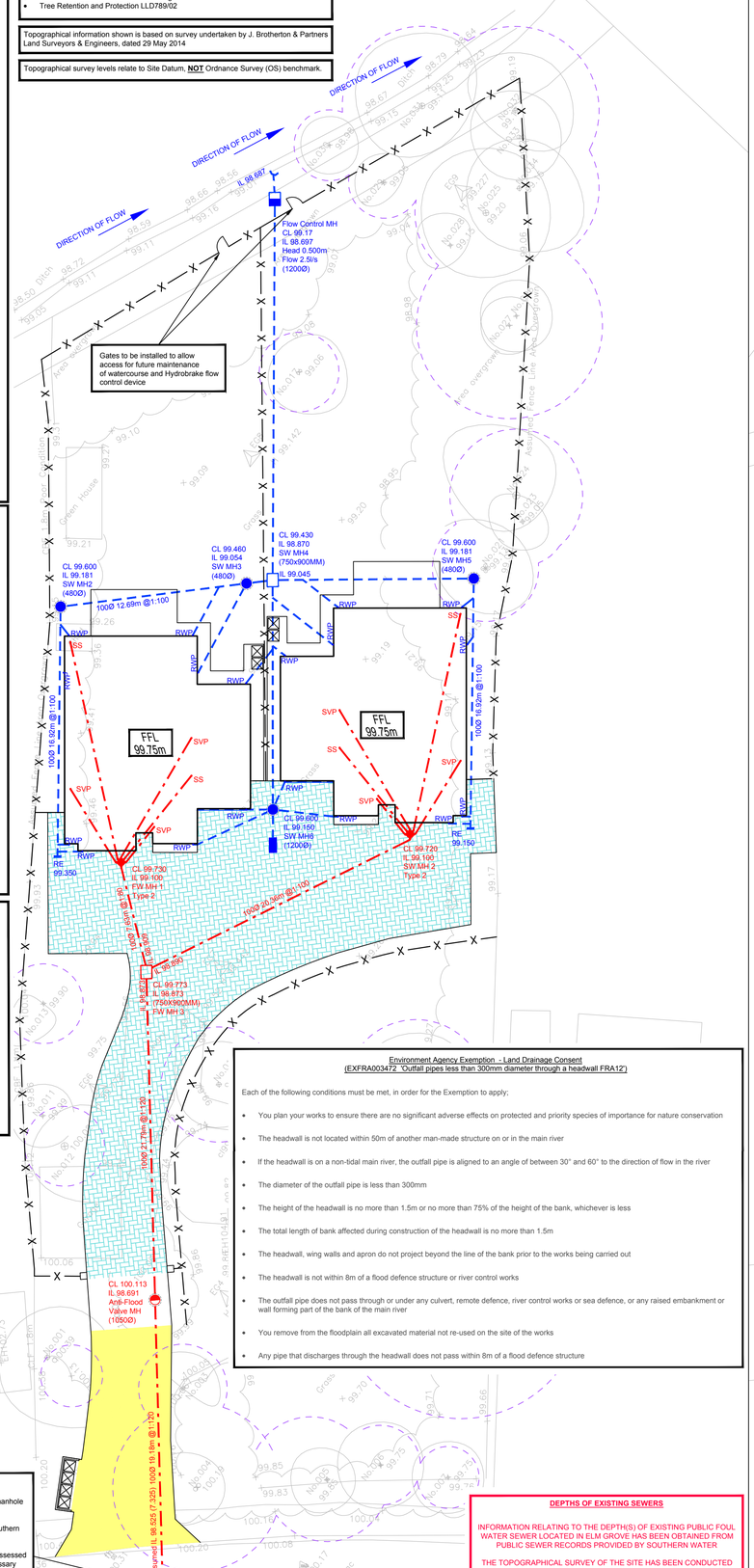
- 871-D-00D Elm Grove Planning.dwg [87853]
- Substructure - RGP Copy.dwg
- JOB-14069-ELM GROVE SURVEY.dwg
- Tree Retention and Protection LLD789/02

Topographical information shown is based on survey undertaken by J. Brotherton & Partners Land Surveyors & Engineers, dated 29 May 2014

Topographical survey levels relate to Site Datum, **NOT** Ordnance Survey (OS) benchmark.

EXISTING WATERCOURSE

ALL WORKS IN RELATION TO THE WATERCOURSE MUST COMPLY WITH THE TERMS OF THE EXEMPTION (EXFRA003472)



Environment Agency Exemption – Land Drainage Consent
(EXFRA003472 'Outfall pipes less than 300mm diameter through a headwall FRA12')

Each of the following conditions must be met, in order for the Exemption to apply;

- You plan your works to ensure there are no significant adverse effects on protected and priority species of importance for nature conservation
- The headwall is not located within 50m of another man-made structure on or in the main river
- If the headwall is on a non-tidal main river, the outfall pipe is aligned to an angle of between 30° and 60° to the direction of flow in the river
- The diameter of the outfall pipe is less than 300mm
- The height of the headwall is no more than 1.5m or no more than 75% of the height of the bank, whichever is less
- The total length of bank affected during construction of the headwall is no more than 1.5m
- The headwall, wing walls and apron do not project beyond the line of the bank prior to the works being carried out
- The headwall is not within 8m of a flood defence structure or river control works
- The outfall pipe does not pass through or under any culvert, remote defence, river control works or sea defence, or any raised embankment or wall forming part of the bank of the main river
- You remove from the floodplain all excavated material not re-used on the site of the works
- Any pipe that discharges through the headwall does not pass within 8m of a flood defence structure

S106 Foul Sewer Connection

- Connection to be made via existing manhole (6001)
- 'Line and Level' to be agreed with Southern Water Clerk of Works
- Condition of existing manhole to be assessed and repaired/rebuilt as deemed necessary

DEPTHS OF EXISTING SEWERS

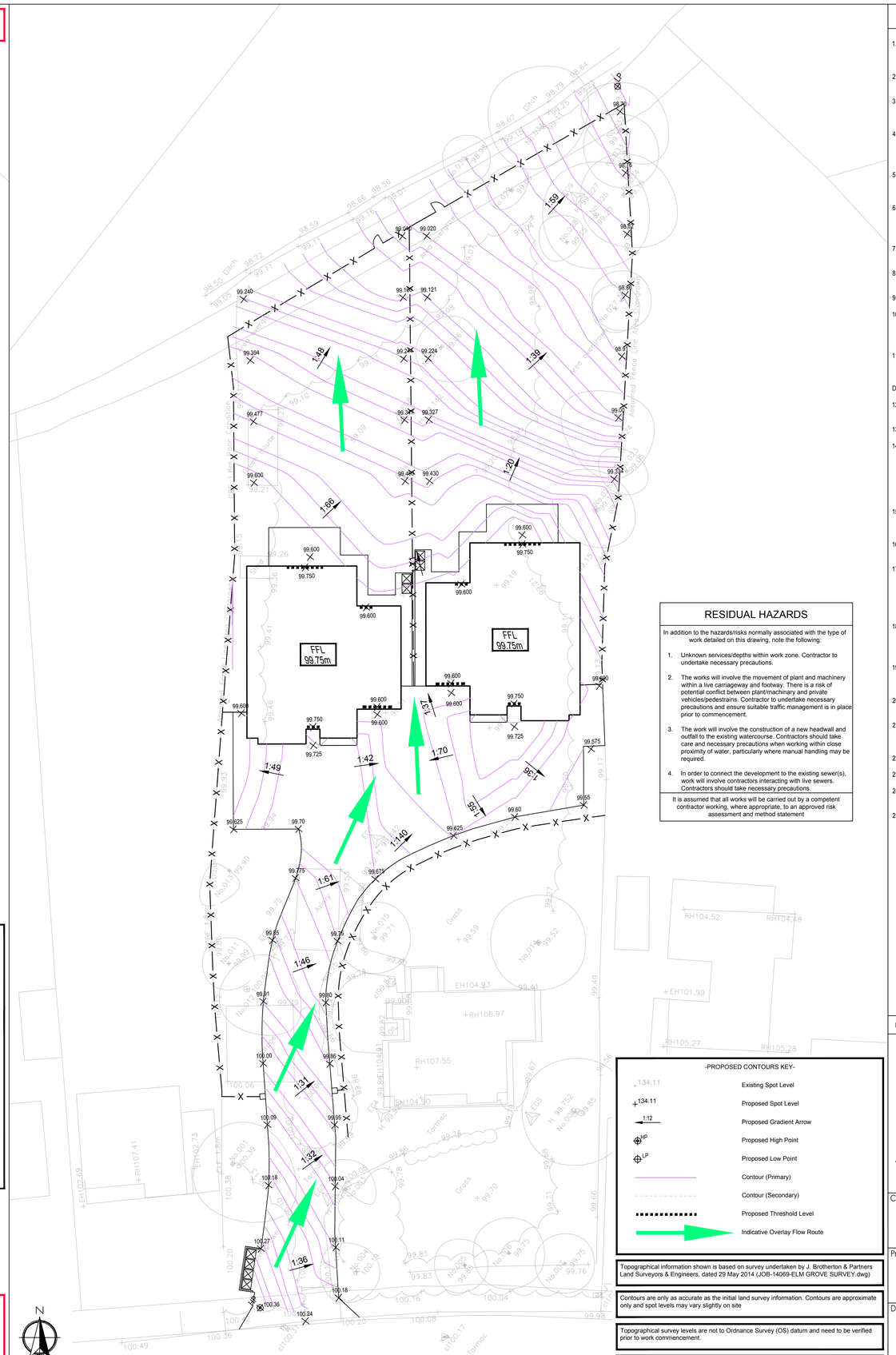
INFORMATION RELATING TO THE DEPTH(S) OF EXISTING PUBLIC FOUL WATER SEWER LOCATED IN ELM GROVE HAS BEEN OBTAINED FROM PUBLIC SEWER RECORDS PROVIDED BY SOUTHERN WATER

THE TOPOGRAPHICAL SURVEY OF THE SITE HAS BEEN CONDUCTED TO SITE DATUM, NOT OS DATUM. THE INVERT LEVEL OF THE PUBLIC FOUL WATER SEWER HAS BEEN INTERPOLATED USING RECURRING FEATURES FOUND ON THE SURVEY

INVERT LEVELS TO BE CONFIRMED ON SITE PRIOR TO WORKS BEING UNDERTAKEN - NO WORK IS TO COMMENCE UNTIL THIS INFORMATION HAS BEEN VERIFIED

Drainage Layout @ 1:200

1:200 @ A1 / 1:400 @ A3 — 0 2 4 6 8 10 12 14 16 18 20 m



Proposed Levels and Contours @ 1:200

1:200 @ A1 / 1:400 @ A3 — 0 2 4 6 8 10 12 14 16 18 20 m

RESIDUAL HAZARDS

In addition to the hazards/risks normally associated with the type of work detailed on this drawing, note the following:

1. Unknown services/depths within work zone. Contractor to undertake necessary precautions.
2. The works will involve the movement of plant and machinery within a live carriageway and footway. There is a risk of potential conflict between plant/machinary and private vehicles/pedestrains. Contractor to undertake necessary precautions and ensure suitable traffic management is in place prior to commencement.
3. The work will involve the construction of a new headwall and outfall to the existing watercourse. Contractors should take care and necessary precautions when working within close proximity of water; particularly where manual handling may be required.
4. In order to connect the development to the existing sewer(s), work will involve contractors interacting with live sewers. Contractors should take necessary precautions.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved risk assessment and method statement

-PROPOSED CONTOURS KEY-

- 134.11 — Existing Spot Level
- +134.11 — Proposed Spot Level
- 1:12 — Proposed Gradient Arrow
- HP — Proposed High Point
- LP — Proposed Low Point
- Contour (Primary)
- Contour (Secondary)
- Proposed Threshold Level
- Indicative Overlay Flow Route

Topographical information shown is based on survey undertaken by J. Brotherton & Partners Land Surveyors & Engineers, dated 29 May 2014 (JOB-14069-ELM GROVE SURVEY.dwg)

Contours are only as accurate as the initial land survey information. Contours are approximate only and spot levels may vary slightly on site

Topographical survey levels are not to Ordnance Survey (OS) datum and need to be verified prior to work commencement.

Please refer to Architect's plans. All RGP drawings are based upon the following drawings, provided by Knightsgate UK;

- 871-D-00D Elm Grove Planning.dwg [87853]
- Substructure - RGP Copy.dwg
- JOB-14069-ELM GROVE SURVEY.dwg
- Tree Retention and Protection LLD789/02

NOTES

A1

1. This drawing is to be read in conjunction with all other RGP drawings, and with all relevant Architect's and Engineer's drawings and specification. Any discrepancies found are to be reported immediately to the Engineer.
2. RGP accepts no responsibility for inaccuracies in data provided by third parties such as topographic surveys or Ordnance Survey mapping.
3. Do not scale, work to figured dimensions only. All dimensions are in millimeters unless noted otherwise and all levels are in metres from the topographic survey datum.
4. Any information given regarding existing underground services is given in good faith after consultation with the relevant authority, however accuracy is not certain. The main contractor is responsible for checking all information on site prior to work commencing and taking due care whilst undertaking the works.
5. All dimensions to be checked on site. All details and dimensions relating to sub-contractors work must be checked and agreed between the sub-contractor or supplier and the general contractor.
6. The electronic information from this drawing can not be guaranteed as dimensionally drawn exact. Figured dimensions must be used for setting out and detailing. RGP logos and company information must be removed from copies if information is re-used.
7. The main contractor is responsible for the design of all temporary works, and is also responsible for the safe maintenance and stability of existing buildings at all times.
8. The main contractor is responsible for dealing with all occurrences of ground water during the construction period.
9. The contractor must comply with all current legislation relating to health & safety.
10. All products specified shall be installed in strict accordance with the manufacturers recommendations and instructions. If there are discrepancies between that information and the details on any RGP drawings, the manufacturers instructions must be used.
11. Contractor to confirm all invert levels where connections are proposed prior to commencing any drainage works. Contractor to commence drainage works at the point of discharge.

DRAINAGE NOTES:

12. All drainage works to be constructed in strict accordance with specification of the local authority, building regulations, sewers for adoption, BS8301 & BSEN.752-1.
13. For location and setting out of building drainage points refer to architects drawings.
14. All pipe runs near buildings to comply with the Building Regulations Part H1. Where a pipe is within 1m of a foundation the trench shall be filled with class GEN3 concrete up to the lowest level of the foundation. Where the trench is further than 1m from the foundation, the trench shall be filled with class GEN3 concrete to a level below the lowest level for the foundation equal to the distance from the foundation less 150mm. In both cases the pipe shall be bedded and surrounded in 150mm thick class GEN3 concrete.
15. Where pipes, external to the structures, have a depth to soffit from ground level of less than 450mm they shall have a class GEN3 concrete encasement (150mm thick).
16. Where a pipe, under a carriageway, has a depth of cover of less than 1.2m the pipe shall be laid with a concrete bed and surround.
17. In any circumstances where pipes are bedded and surrounded in concrete flexible joints should be provided. Compressible boards (fibreboard or polystyrene) shall be provided at a maximum of 8m centres (coinciding with pipe joints). The boards shall be pre-cut to pipe diameter and to a height and width equal to the concrete cross section. A board thickness of 18mm for pipes up to 450mm nominal diameter and 36mm for pipes over 450mm nominal diameter.
18. All private building drainage shall be constructed in strict accordance with BSEN.752-1. unless otherwise specified building drainage shall be 100mm diameter and shall be laid at a minimum gradient of (<1l/s = 1 in 40/>1l/s = 1 in 80) for foul drains and 1 in 80 for surface water drains.
19. All pipes, bends and junction for private building drainage shall be UPVC conforming to BS4660 and BS5481 as appropriate and shall be laid in accordance with the manufacturer's specification.
20. All gully connections other than at manholes to be 'y' junctions. All road gully connections to be 150mm diameter.
21. All stub stacks to be fitted with air admittance valves where branch drain exceeds 12m except at the head of the run. Soil vent pipes located at the head of a run to terminate to fresh air.
22. All connections to be soffit to soffit unless otherwise noted.
23. All concrete and concrete products to be in accordance with BRE 363 for sulphates.
24. The locations and sizes of all svps and rwps shall be cross referenced against the architects drawings during setting out.
25. The precise depth and location and size of existing pipes or manholes where connections or diversion are proposed must be confirmed and reported to the engineer prior to commencement.

RGP SUPPORTING DRAWINGS:

Drg No.	Drg Title.
002	Engineering Layout - Surface Finishes & Setting Out
003	Construction Details Sheet 1 of 2
004	Construction Details Sheet 2 of 2

CONSTRUCTION

Rev.	Date	Amendments	Drawn	Appr.
C	31/01/2018	Strategy confirmed in view of geotechnical investigation results, updated to 'Construction' status	SPB	MJA
B	22/01/2018	Area of porous paving revised	SPB	MJA
A	19/01/2018	Revised site layout, area of porous paving refined	SPB	MJA
-	16/01/2018	Original Issue	SPB	MJA

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Client
Knightsgate UK Ltd

Project
Land at 59 Elm Grove, Barnham, West Sussex PO22 0HJ

Drawing Title
Engineering Layout
Drainage, Proposed Levels & Contours

Scale	Drawn By	Checked By	Approved By
1:200	SPB	LDF	LDF

Date	Drawing No.	Rev.
January 2018	2017/D1393/001	C