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A29 Realignment Scheme – Phase 1

Highway Specification

Drainage and Service Ducts

Appendix 5

December 2020

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Quality Management

Job No	CS/099505		
Project	A29 Realignment Scheme		
Location	Between A29 Fontwell Avenue (south of Eastergate Lane) to 230m south of B2233 Barnham Road		
Title	Highway Specification Drainage and Service Ducts Appendix 5		
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Revision Status / History

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S3-P01	11.09.20	First Draft	AZ	KS	TS
S3-P02	10.12.20	Amended with WSCC comments	AZ	KS	TS

SERIES 500: DRAINAGE

Appendix 5/0: Drainage General

Appendix 5/1: Drainage Requirements

Appendix 5/2: Service Duct Requirements

~~Appendix 5/3: Surface Water Channels and Drainage Channel Blocks – Not Used~~

Appendix 5/4: Fin Drains, Narrow Filter Drains and Filter/French Drains

Appendix 5/5: Combined Drainage and Kerb System

~~Appendix 5/6: Linear Drainage Systems (Channel Drains and Slot Drains) – Not Used~~

~~Appendix 5/7: Thermoplastics Structural Wall Pipes and Fittings – Not Used~~

Appendix 5/0: DRAINAGE GENERAL

1.1 The specification is based on the WSCC Framework – Schedule 3.1 Works and Site Information – Specification for Highway Works – Issued Draft V3.

1.2 Clauses have been added or amended to suit project specific requirements.

1.3 Clauses not relevant have been struck through.

1.4 Other than where references to the Overseeing Organisation (West Sussex County Council) are made in the context of the Overseeing Organisation granting statutory or type approvals, the roles and functions of the Overseeing Organisation shall be undertaken by the Project Manager.

1.5 Where the Specification requires the provision of documentation to the Overseeing Organisation for statutory or type approval such documentation shall be provided to the Project Manager.

1.6 Where the Specification is used in conjunction with a Contract under which the Contractor is responsible for the design of any part of the Permanent Works, the delegation of the roles and functions of the Overseeing Organisation, as stated in paragraph 1.4 above shall be further amended as follows:

(i) If any agreement, consent, or approval required to be obtained from the Overseeing Organisation impacts on the health and safety of the general public, the environment or any other property or equipment not owned or operated by the Contractor, such agreement, consent, or approval shall be obtained from the Project Manager.

(ii) Where the specification provides for the Overseeing Organisation to require a test, waive the requirements for a test, or alter testing frequency, the party to whom the Overseeing Organisation's roles and functions have been ascribed by paragraph 1.4 shall be the Employer.

Appendix 5/1: DRAINAGE REQUIREMENTS

1.0 Piped Drains

1.1 Pipes shall be laid to constant gradients between the pipe invert levels stated in the schedules and on the layout plans.

1.2 Following the Overseeing Organisation's acceptance of their proposals the Contractor shall not make any changes to the agreed details without prior written approval of the Overseeing Organisation. Any changes that the Contractor wishes the Overseeing Organisation to consider should be submitted at least two weeks prior to the start date of the works affected. The Contractor shall also submit any such changes in writing.

1.3 The 'end on' junction between existing gully connections to be reused and new gully connections shall be made using proprietary systems/products. The end of the existing gully connection shall be cut square as required. - I'm not sure what this section means?

1.4 The hydraulic design of the drainage system has been carried out using the Wallingford procedure using the following design criteria: -

(a)	the pipe roughness design height	= 0.600mm
(b)	the time of entry	= 4.0 mins.
(c)	the minimum design velocity	= 1.0 m/s
(d)	the minimum DWF velocity	= 0.75 m/s
(e)	No surcharging, the return period	= 1 in 1 ~~2~~ years Current WSCC standard requires 1:2 Year design
(f)	there shall be no flooding for a return period	= 1 in 5 years & 30 year Design must be assessed for 1:100 year return period plus CC
(g)	the minimum pipe diameter for gully laterals	= 150mm
(h)	the minimum cover to pipes adjacent to or under roads	= 1.00m
(i)	The minimum pipe diameter for highway spine drains	= 225mm

1.5 The Overseeing Organisation shall accept the pipe and bedding combinations given in Table 5/1A for the installation of highway drainage up to the depths shown. Bed and surround types S, B and Z shall comply with HCD drawing no. F1

Table 5/1A – Pipe and bedding combinations

Pipe and Bedding Combinations for Highway Drainage [3]					
Cover Depth[1]	Vitrified Clay Class (120)[2]	Concrete Class M	PVC-U Class SN4	Polypropylene Class SN8	Polyethylene Class SN8
0.75m – 0.9m	Z	Z	Z	Z	Z
0.9m – 2.0m	S	S	S	S	S
2.0m – 3.0m	S or B	S or B	S or B	S or B	S or B
3.0m – 4.0m	S or B	S or B	S or B	S or B	S or B
4.0m – 5.0 m	S	S	S	S	S
5.0m – 6.0m	S	S	S	S	S

Notes

(i) The cover is measured along the pipeline between drainage structures and the minimum value used to determine the pipe and bedding combination. This combination shall be used over the full length of pipe between the drainage structures.

(ii) Vitrified Clay pipe size 150mm internal diameter shall have crushing strengths not less than 28 KN/m

(iii) ~~For pipes on bed Types B and S material graded 40 to 5mm or 40mm single sized aggregate shall not be used~~. The aggregate for pipes on beds types B & S shall be in accordance with Cl 503.3 (i)

(iv) For plastic pipes on bed Type Z, a minimum 150mm thick ST2 concrete bedding and surround shall be used. Backfilling over plastic pipes shall not be carried out until after the insitu concrete has cured.

2.0 Trench backfill

2.1 Trenches for pipes shall be backfilled above the pipe surround with:

i) acceptable imported material to clause 505.2.
ii) ST2 concrete
iii) Site cast (as dug) material
iv) as shown on the drawings
v) in carriageway areas, Type 1 sub-base to Cl 803.

3.0 Chambers

3.1 All chambers currently detailed within the Manual of Contract Documents for Highway Works – Volume 3 Highway Construction Details may be utilised, ~~as detailed within the Work Order,~~ with the following conditions:

(i) corrugated galvanised steel chambers shall not be used.
(ii) cast in-situ concrete chambers shall not be used.
(iii) brickwork in chambers shall use un-perforated bricks.
(iv) Sulphate Resisting Portland cement is required for all pipes, chamber rings, cover slabs and gully pots manufactured from concrete. Also, any ancillary concrete used in conjunction with the drainage installation shall use sulphate resisting Portland cement.

3.2 Chamber schedules consist of the following, and the standard detail references used are as follows-

~~(a) manholes: type MH1 standard detail EHA/0500/001 (Brick Construction Manhole)~~
~~(b) catchpits: type CP1 standard detail EHA/0500/003 (Precast Concrete Construction)~~

~~CP1 standard detail EHA/0500/002 (Brick Construction)~~

~~(c) soakaways: Precast concrete soakaways of internal chamber diameters 1500, 1800 and 2100mm shall be constructed in accordance~~

~~with standard detail EHA/0500/004.~~

For chamber schedules refer to catchpit detail Type 7 chamber (1050 Catchpit) drawing no. HCD F11.

3.3 Existing chambers to have the covers and frames removed, raised or lowered are described in the project specific Works Information. Removing, raising and lowering of covers and frames on existing chambers shall be carried out in accordance with Advice Note HA 104/09 (DMRB 4.2.5).

3.4 Raising or lowering of covers to heights or depths greater than 500mm shall be achieved by the extension or reduction of the main chamber or shaft in materials of the same size and type as the existing chamber. The completed manhole/chamber shall have the appropriate steps/rungs and other ancillary equipment installed as shown on HCD F11 for the appropriate final depth.

4.0 Gullies

4.1 Gullies shall be as per Highways Maintenance Efficiency Programme Standard Detail Drawing no. HMEP/0500/007 Precast and Insitu Cast Gullies.:

Gully type:

~~Trapped~~	~~HCD F13~~
~~Untrapped~~	~~HCD F13~~
~~Sumpless~~	~~HCD F14~~
~~Footway~~	~~EHA/0500/005~~
~~Kerb Inlet~~	~~EHA/0500/009~~

4.2 Reinstatements of carriageways after construction of drainage trenches shall comply with the requirements of Appendix 7/2.

4.3 Gulley positions and spacing in relation to highway stringlines for setting out.

String Line	Start Chainage	End Chainage	Gulley Ref. Numbers	Max. Gulley spacing (m)	Note
FKA1	54.5	54.5	G18 – G19	-	Double Gulley at Low point
	72.3	72.3	G25 – G26	-	Double Gulley Upstream of Driveway
	95.1	95.1	G27 – G28	-	Double Gulley at Low point
	95.1	106.9	G29	5.2	Low point – High point
	106.9	134.9	G30 – G33	9.2	High point – Low point
	134.9	153.4	G34 – G35	13.8	Low point – High point
	174.4	174.4	G36	-	Gulley at Low point
FKA2	35.9	51.4	G16 – G17	9.1	High point – Low point
	51.4	93.8	G9 – G15	6.2	Low point – High point
	93.8	123.6	G1 – G8	4.1	High point – Low point
FKA3	0	32.5	G37 – G38	13.4	Start of Stringline – High point
	32.5	49.5	G39 – G40	9.2	High point – Low point
	49.5	83.4	G41 – G45	6.8	Low point – High point
	83.4	113.3	G46 – G49	9.7	High point – Start of Swale
FKA4	0	5.5	G23 – G24	5	2 New Gullies at 0.5m & 5.5m
FKA5	3.4	3.4	G21	-	New Gulley Adjacent to Existing
	17.4	17.4	G20	-	New Single Gulley
FICD	7.3	7.3	G50 – G51	-	Double Gulley at Splitter island
	46.5	46.5	G52 – G53	-	Double Gulley at Splitter island
	93.8	93.8	G54 – G55	-	Double Gulley at Splitter island
DKA2	0	34.3	G7 – G9	9.3	Start of Stringline – High point
	34.3	61.8	G1 – G6	5.7	High point – Low point
DKA3	0	31.9	G12 – G17	5.2	Start of Stringline – High point
	31.9	61.7	G10 – G11	12.4	High point – End of Stringline
A29 Centreline	494.5	515.9	G18 – G21	5.2	DKA3 Ch.0 – Start of Swale (Adjacent to Stringline DKA3)
DICD	9.2	9.2	G26 – G27	-	Double Gulley at Splitter island

	39.6	**39.6**	**G24 – G25**	**-**	**Double Gulley at Splitter island**
	71.3	**71.3**	**G22 – G23**	**-**	**Double Gulley at Splitter island**
BKA1	**40.6**	**64.8**	**G1 – G5**	**4.8**	**40m – High point**
	64.8	**73.8**	**G6 – G7**	**6.2**	**High point – Crossing point**
BKA2	**14.5**	**34.8**	**G13 – G14**	**10.1**	**End of Beany Block – High point**
	34.8	**53.6**	**G15 – G17**	**6.2**	**High point – 55m**
BKA3	**38.5**	**38.5**	**G8**	**-**	**New Single Gully upstream of crossing**
BKA4	**60.6**	**80.3**	**G10 -G12**	**6.5**	**High point – Start of Beany Block**
BICD	**39.9**	**39.9**	**G18 – G19**	**-**	**Double Gulley at Splitter island**
	89.8	**89.8**	**G20 – G21**	**-**	**Double Gulley at Splitter island**
	118.8	**118.8**	**G22 – G23**	**-**	**Double Gulley at Splitter island**

5.0 Design Considerations for Chamber and Gully Gratings and Frames

5.1 Chamber tops and gully tops shall be specified to comply with BS EN 124, BS 7903 and the requirements of ~~HA 104/02~~ CD 534 - Chamber tops and gully tops for road drainage and services.

5.2 The minimum class of chamber top or gully top to be installed in major carriageway locations shall be D400. Where the ironwork is to be subjected to only occasional traffic loading up to 5 tonnes, class C250 may be used.

5.3 All ironwork located in the footway is to have a minimum class of C250, unless otherwise agreed with the Overseeing Organisation.

5.4 Where ironwork is located in the wheel paths of major routes, carrying >1500 cvd in each direction, then consideration should be given to specifying strength class E600.

5.5 All products used shall have been assessed and certified as required by ~~HA 104/02~~ CD 534 and shall have been issued with product conformity certificates to BS EN124.

6.0 Design of Chamber Tops

6.1 Any chamber constructed for man-entry purposes, with a rectangular opening, shall have a minimum clear opening of 600mm with a diagonal measurement >700mm. Circular openings shall be 700mm minimum diameter. Triangular openings shall have a minimum diametric measurement of 700mm.

6.2 Class D400 frames shall be a minimum 150mm deep. The depth of insertion of the cover within the frame shall be 50mm minimum if the cover is secured or 80mm minimum if relying on the depth of insertion for security.

6.3 Seatings of covers in frames shall be such that stability and quietness are achieved without the need for cushioning inserts or the need for periodic maintenance.

6.4 The frame bearing area shall be designed such that the nominal bearing pressure, in relation to the appropriate BS EN 124 test load, shall not exceed 2.1MPa. The minimum bedding width of the frame at any point shall be 50mm.

6.5 Frames weighing more than 15kg shall be provided with lifting holes located to permit a balanced lift

6.6 Frames shall not contain bedding flange holes located beneath the cover seatings. Any bedding flange holes present shall be allowed for when calculating the bearing pressure under test load.

7.0 Design of Gully Tops

7.1 Gully tops shall comply with BS EN 124, BS 7903 and ~~HA 104/02~~ CD 534.

7.2 Hinged gully gratings and frames may be kerb hinged or side hinged as appropriate to the traffic flow.

7.3 The minimum area of waterway should be ~~1080cm2~~.1200cm2.

8.0 Bedding Materials

8.1 Chamber tops and gully tops shall be bedded using material with the following properties:

Low - shrink.
Minimum workable life of 15 min.
Compressive strength >30 MPa in 3 hrs.
Tensile strength > 5 MPa in 3 hrs.

8.2 This specification is for a rapid hardening material and is typically achieved by the use of resin based products. Bedding materials shall be laid strictly in accordance with manufacturer's recommendations, taking particular account of site conditions, temperatures and thickness of material used.

9.0 Small Headwalls and Small Revetments.

9.1 Small outfalls shall be to the details shown in the WSCC standard detail drawing no. ~~EHA/0500/006~~ S278/38/23 unless noted separately within the Works Information. Concrete bagwork shall comply with Clause 519. A detail for a typical concrete bagwork headwall is given in the standard detail ~~EHA/0500/008~~ Headwall Detail for pipe sizes up to 600mm diameter concrete Bagwork – drawing no. S278/38/23

Re the above drawing references we are currently using two different references WSCC Adoption drawings – S278/38/23 and further down in Section 13.0 you are using references to the Major Projects Standard drawings. Which should we be using??

10.0 Checking & Flushing of New Drainage Systems

10.1 All new drainage pipeline systems (i.e. excluding the maintenance of existing pipelines) less than 350mm diameter shall be checked by drawing through each completed length of pipe a spherical mandrel of a diameter 10mm less than the smallest internal pipe diameter.

11.0 Disused, Amendments and Cleaning of Existing Drainage Systems

11.1 All ironwork adjustments shall be undertaken prior to laying any surfacing materials.

11.2 Existing pipework that is redundant and to remain in-situ, shall be grout sealed in accordance with Clause 506.3. Where instructed by the Overseeing Organisation redundant pipes shall be removed and replaced with suitable backfill as described Clause 505.

11.3 Redundant gullies to be removed shall have the ironwork and brickwork takenup and removed from site and the pots filled with ST2 concrete. The concrete shall be left to cure before reinstating to the finished surface.

~~11.4 The end to end connection between existing and new pipework, not using an oblique junction or saddle, shall be carried out as per standard detail EHA/0500/007~~

12.0 CCTV of Existing Drainage System

13.1 CCTV drainage surveys have been undertaken for Fontwell Avenue and Barnham Road.

13.0 Filter Drains

~~13.1~~ Filter drains shall comply with ~~HCD F2 Type G, H, J or K.~~ WSCC-SD1-0500-043.

13.2 The perforated pipework shall discharge to a catchpit chamber prior to connecting to the carrier pipework system.

13.3 Filter drains are to be backfilled with Type A, B and the specification of Types A and B are given in Clause 505 (Table 5/5) of the SHW. A permeameter test in accordance with HA 41/90 will be required for all other material.

13.4 Geotextiles used in filter drains shall be a synthetic woven or non-woven, thermally bonded or mechanically needled fabric composed of polypropylene or polyester filaments and shall have a life expectancy of 100 years.

13.5 Where Type B filter media is specified, at surface level to be a single size stone layer with a geotextile required above filter media to prevent ingress/loss of fines.

13.6 Perforated concrete pipes if used to BS5911 Part 110 shall comply with the strength requirements of Table 2 of BS 5911.

13.7 Perforations in concrete pipes if used to BS5911 Part 110 shall have an area of not less than 1000mm² of holes per metre length of pipe.

13.8 Filter drains in verges are to be constructed using perforated or slotted pipes. Where perforations are provided only to part of the circumference of the pipe, the perforations shall be laid uppermost. Joints in filter drains shall be as per Clause 504.6. Note pipe sizes specified in the Works Information have been based upon the Polypipe Ridgidrain product.

14.0 Highway Ditch and Swale

14.1 Refer to drawing numbers A29-CAP-HDG-00-DR-D-0047 to 0052, for the location of the ditches and swales.

14.2 Highway Ditch in accordance with standard detail no. S278/38/25 type B with 1 in 3 slopes.

14.3 Highway Swale in accordance with standard detail no. A29-CAP-HGD-00-DR-D-0198 and S278/38/26 type B. with the carriageway edge include in the 0.5m

15.0 Infiltration Storage Tanks

15.1 Refer to drawing number A29-CAP-HDG-00-DR-D-0185 for typical details of the SDS GEOlight Infiltration system or equivalent approved.

15.2 The SDS GEOlight units are to be installed as per manufacture requirements for an infiltration tank with permeable geotextile layer.

15.3 Side or top connection for air vents is required.

15.4 The system is to consist of a central perforated distribution pipe which feeds the stormwater storage reservoirs on either side formed from GEOlight

15.5 Units to be SDS GEOlight 400 with compressive strength 400kN/m2.

16.0 Oil Interceptors

16.1 Oil interceptors to be Kingspan Bypass Separators or equivalent with oil level alarm systems.

16.2 Refer to drawing nos. A29-CAP-HGD-00-DR-C-0048 for by pass separators size requirements

Appendix 5/2: SERVICE DUCT REQUIREMENTS

1 Road and Street Lighting

1.1 Road lighting ducts shall meet the requirements of BS EN 50086 Parts 2-4 paying particular attention to Table 101 – Conduit Diameters and shall be sufficiently rigid to experience no deformation during backfilling and compaction but be capable of bending to the radius required.

1.2 Where multiple ducts are installed, they shall be separated by purpose made spacers.

1.3 Ducts shall be manufactured from Medium to High Density Polyethylene, with a minimum wall thickness as follows:

(i) To ISO 161- 1: 2018
(ii) Min Internal diameter 47mm, normally use 50mm diameter, 3.5mm thickness.
(iii) Min Internal Diameter 94mm, normally use 100 mm diameter, 5mm thickness.

1.4 Ducting systems shall be either smooth wall with smooth-bore and supplied in 6 metre lengths complete with integral couplings or corrugated externally and be twin walled with internal smooth-bore and supplied in 6 metre lengths or 100 metre rolls with separate couplings.

1.5 The ducts shall be coloured **orange** throughout their length and shall be indelibly marked, by indentation, with the legend "Street Lighting" in 9mm high white characters at intervals of 1m. When laid the wording shall be visible from above.

1.6 All cross carriageway ducts shall be 100mm diameter unless otherwise stated and have an additional ‘spare’ duct of the same diameter to those being utilised.

1.7 Warning marker tape shall be installed centrally above all ducts.

1.8 The Ducts shall be installed as shown on standard details 14074 sheets 1 to 3 ~~EHA/1400/036, EHA/1400/037 and EHA/1400/038.~~

1.9 Chambers shall be of interlocking polypropylene sections and installed as detailed on standard detail 14074 sheets 1 to 3 ~~EHA/1400/036, EHA/1400/037 and EHA/1400/038.~~

1.10 Chamber cover and frame shall conform to BS EN 124 and be a minimum C250 ~~B125~~ class for footway, D400 class for Carriageway. Covers shall fasten to chambers by means of 8mm non-ferrous coach screws and shall be marked only with the legend “Street Lighting”.

1.11 Recessed galvanised steel covers may be used for paved areas.

1.12 A smooth-bore flexible duct shall be used to connect to each item of street

furniture requiring a private network supply.

1.13 Prior to the installation of cables, the duct shall be proved by drawing a mandrel through the duct. The Service Duct Alignment Test (Appendix 1/5).

1.14 The cross-carriageway ducts shall extend a minimum of 600mm beyond each kerb face or back of footway ~~behind footpath~~ where relevant. A suitable non-perishable draw cord shall be installed.

1.15 All ducts shall be sealed until the cables are drawn in and resealed following installation of cabling. A 'spare' draw cord shall be installed in all ducts.

1.16 All cross-carriageway ducts shall be installed to a minimum depth of 750mm.

~~2 Traffic Signals and Controllers~~

2.1 ~~The positions of ducts are to be located as shown on the Construction drawings and / or as directed by the Overseeing Organisation.~~

2.2 ~~Where specified carriageway loop connection boxes shall be used for the entry of inductive detector loops under the kerb lines into the duct system and are to be positioned as shown in signal design drawings and installed as per Highway Construction Details Drawing (HCD) G25 and the Overseeing Organisations instructions. Covers of carriageway connection boxes are to securely fasten together.~~

2.3 ~~Where through kerb accesses for loop feeders are specified, they shall be constructed as per HCD Drawing G24.~~

2.4 ~~Duct bedding and installation combinations shall be as detailed by SSE on Lighting Details drawings and specification.~~

2.5 ~~The minimum cover below finished level unless specified by the Overseeing Organisation shall be as per Drgs EHA/1400/037 and EHA/1400/038 Duct and Pit Details.~~

2.6 ~~Ducts sizes shall be 100 or 50mm diameter~~ **orange or black** ~~coloured MDPE (as specified by the Overseeing Organisation) and have "Traffic Signals" etched in white at 1 metre intervals along its length. When laid the wording shall be uppermost.~~

2.7 ~~All ducts to have smooth internal bore. Joints between sections of ducts shall have any burrs removed and the edges shall be chamfered.~~

2.8 ~~Multiple ducts installed in a single trench shall be strapped together at 1m intervals.~~

2.9 ~~Unless specified by the Overseeing Organisation, all inspection chambers & draw pits shall be of either brick construction, constructed on a bed of concrete with adequate drain away as per Drgs EHA/1400/037 and EHA/1400/038 Duct and Pit Details; or pre- formed chambers installed as per the manufacturer's instructions~~.

2.10 ~~All inspection chambers, where possible, shall be installed at a minimum of 1.5m away from all adjacent carriageways. Measurement is to be taken from the nearest edge of chamber.~~

2.11 ~~No equipment shall be re-positioned unless prior written authorisation is obtained from the Overseeing Organisation.~~

2.12 ~~Inspection chambers and or pole retention sockets located behind road restraint systems, (safety barriers) shall not be installed within the current minimum safety working width.~~

2.13 ~~Chamber sizes are to be as per the signal design drawing and as directed by the Overseeing Organisation.~~

2.14 ~~Chamber cover and frame shall be class C250 B125 minimum in footway and D400 in carriageway.~~

2.15 ~~Traffic Signal Chamber covers shall be composite,~~ **~~black~~** ~~in colour and be marked only with the legend "Traffic Signals".~~

2.16 ~~Where access chamber covers are in tactile paving, recessed pit covers shall be used to allow the tactile surface to be installed within the cover using an appropriate mortar bed.~~

2.17 ~~Ducts are to extend in to access chambers/poles boxes to a distance of 25mm +/- 5mm~~

2.18 ~~Polypropylene draw cords are to be installed in all ducts at time of installation. If draw cords are omitted at installation, the Contractor shall install draw cords prior to any cable pulling activities.~~

2.19 ~~All cable shall be pulled into ducts by the use of draw cord. New draw cord shall be pulled in at the same time. Installing cable by the use of rods is not acceptable. It shall be the responsibility of the Contractor to ensure that all duct runs are clear of obstructions and contain draw cord before cable installation work begins.~~

2.20 ~~Draw cords shall be left in all ducts; they shall be secured by tying/fixing the draw rope to stoppers or securely fastened within the draw pit as appropriate. Two metres of slack ropes shall be provided at both ends of every duct.~~

2.21 ~~Duct ends shall be sealed with expanding foam upon completion of cabling works.~~

Appendix 5/3: SURFACE WATER CHANNELS AND DRAINAGE CHANNEL BLOCKS – Not Used

~~1. Channel blocks shall be to HCD Drawing F15. The channel blocks shall be one of the following:-.~~
~~(i) Drainage channel block Type B, with a 'R' of 190mm.~~
~~(ii) Drainage channel block Type C with 'L' value of 915mm.~~

~~2. All drainage channel blocks shall be constructed on a bed and haunch of ST3 concrete, to a thickness of 75mm and 150mm, respectively.~~

Appendix 5/4: Fin Drains and Narrow Filter Drains

1. ~~Narrow filter drains shall be either Type 8 or Type 9 as specified in HCD F18 and F20 and in the Works Information.~~

2. Refer to drawings A29-CAP-HDG-00-DR-C-0048 to 0052 for the location of fin drains

Appendix 5/5: Combined Drainage and Kerb System

1. ~~The Works Information shall show the locations of the combined drainage and kerb system, with the position and invert level of the surface water outfall connection and the kerb profile. The Contractor shall be responsible for the design of the combined drainage and kerb system gradients, access locations, silt trap locations and outfall and end units~~. Refer to drawing numbers A29-CAP-HDG-00-DR-D-0047 to 0052 for the location of the combined drainage kerb systems.

2. The kerb upstand shall be 125mm and top sections shall have HB2 kerb profile. (Unless otherwise stated).

3. Units shall have Class D400 strength.

4. The hydraulic design of the system shall be carried out using the following design criteria: -

(i)	No surcharging	= 1 in 1 year
(ii)	There shall be no flooding for a return period	= 1 in 5 years & 1 in 30 year

~~Or as Stated in the Work Order.~~

5. The Contractor's attention is drawn to clause 516.7 of the specification which states that the joints between the units shall be watertight.

6. The combined kerb drainage system to be as indicated on Drainage layout Plan drawings A29-CAP-HDG-00-DR-D-0047 to 0052 and WSCC standard details drawing WSCC-SD1-0500-043.
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Marshall Mini Beany units are not to WSCC standard details. Units should be the wider 430mm units as per S278/38/02.

7. Proprietary trapped outfall gullies associated with combined kerb and channel drains shall be constructed in accordance with the manufacturers' recommendations.

Appendix 5/6: LINEAR DRAINAGE SYSTEMS – Not Used

~~**1 Pedestrian areas subject to occasional light vehicle loading**~~

~~1.1 The Work Order shall show the locations of the linear drainage system, with the position and invert level of the surface water outfall connection and the kerb profile. The Contractor shall be responsible for the design of the linear drainage system gradients, access locations, silt trap locations and outfall and endunits.~~

~~1.2 Drainage channel systems are to be installed as per the manufacturer's instructions.~~

~~1.3 The slots in the grating shall be designed to minimise the possibility of trapping narrow heeled shoes.~~

~~1.4 The channel grating shall be galvanised and be bolted to the channel.~~

~~1.5 Units located in the carriageway shall have Class D400 strength, for units located elsewhere see Work Order for strength requirements.~~

~~1.6 The hydraulic design of the system shall be carried out using the following design criteria: -~~

~~(i) design rainfall = 50mm/hour~~
~~(ii) there shall be no flooding for a return period = 1 in 5 years Or as stated in Appendix 1/11~~

~~1.7 The contractor's attention is drawn to clause 516.7 of the specification which states that the joints between the units shall be watertight.~~

Appendix 5/7: THERMOPLASTICS STRUCTURAL WALL PIPES AND FITTINGS – Not Used

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