

**KEY**

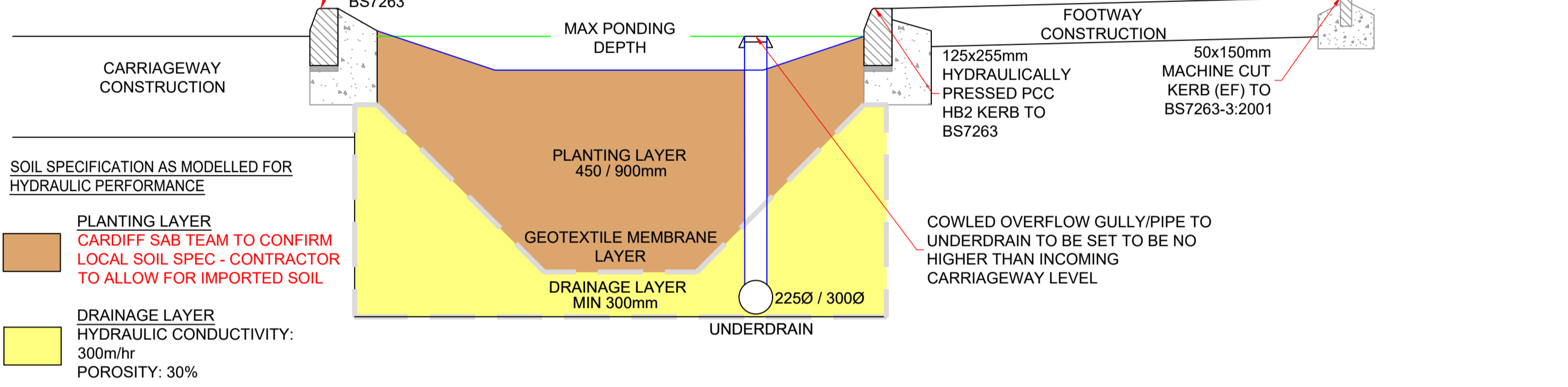
- EXISTING SEWER TO BE MADE REDUNDANT
- PROPOSED SURFACE WATER SEWER
- PROPOSED FOUL SEWER
- SEWER EASEMENT
- INDICATIVE PERMEABLE PAVING SYSTEM
- PROPOSED SUDS FEATURE - ADOPTABLE - RAINGARDEN / RAISED PLANTER / SWALE
- PROPOSED SDS CRATES - ATTENUATION
- LINEAR DRAIN / ACO DRAIN
- SURFACE INLETS (IN) / OUTLETS (OUT) - LINEAR DRAIN, DISHED CHANNEL ETC
- SUB-SURFACE INLETS (IN) / OUTLETS (OUT) - PIPES / UNDERDRAINS
- HB2 KERB WITH INLETS
- EXISTING WATERCOURSE TO BE UTILISED SUBJECT TO OWC APPROVALS (WATERCOURSE TO BE SURVEYED TO CONFIRM DESIGN INTENT)

**DRAINAGE PHILOSOPHY**  
SURFACE WATER

- DRAINAGE PROPOSALS ARE ILLUSTRATIVE OF DESIGN INTENT AND REMAIN SUBJECT TO DETAILED DESIGN AND SAB APPROVAL
- GROUND INVESTIGATION UNDERTAKEN BY TERRA FIRMA (REF 13601, MAY 2016) DETERMINED THE UNDERLAIN GROUND CONDITIONS UNSUITABLE TO SUPPORT INFILTRATION
- DISCHARGE RATES TO BE RESTRICTED TO GREENFIELD RATES BY FLOW CONTROL WITH APPROPRIATE ON-SITE ATTENUATION MEASURES.  
SITE SPECIFIC GREENFIELD RATES BY FEH / REFH2 METHOD;  
CARDIFF COUNCIL DEFAULT MINIMUM 2.5ls & Q100: 6.00ls/Ha  
APPLIED ON A PRO-RATA BASIS TO HARDSTANDING CONTRIBUTING AREAS WITH STORAGE PROVIDED TO CATER FOR THE Q100+40%cc STORM EVENT
- VARIETY OF SUDS FEATURES TO BE INTEGRATED INCLUDING RAINGARDENS, BIORETENTION FEATURES AND PERMEABLE PAVING TO PROVIDE DRAINAGE FUNCTION AND PROMOTE AMENITY AND BIODIVERSITY VALUES
- PROPOSED LEVELS INDICATIVE OF DESIGN INTENT AND PRINCIPLES OF FALLS REQUIRED FOR SUDS FEATURES TO ACT IN CASCADE / SEQUENCE AND REMAIN SUBJECT TO DETAILED DESIGN.
- EXISTING WATERCOURSE TO BE UTILISED IN SURFACE WATER STRATEGY. WATERCOURSE TO BE SURVEYED & CLEANED AND CONNECTIONS WILL BE SUBJECT TO OWC APPROVALS.
- PROPOSED SURFACE WATER STRATEGY WILL REQUIRE SOME ALTERATIONS TO PROPOSED BOUNDARY FEATURES ON SITE PLAN TO ALLEVIATE SOME 'LANDLOCKED' AREAS. (SEE NOTES ON PLAN). FURTHER ENHANCEMENTS TO THE SURFACE WATER STRATEGY MAY BE POSSIBLE WITH FURTHER CHANGES.

**FOUL**

- PROPOSED DEVELOPMENT TO DRAIN FOUL DISCHARGE TO EXISTING DCWW PUBLIC SEWERAGE NETWORK
- ON PLOT FOUL DRAINAGE OMITTED FOR CLARITY
- SUBJECT TO DCWW APPROVALS; S104 AND S106 AGREEMENTS REQUIRED
- PHASE 1 (WILLOWBROOK NORTH) FOUL DRAINAGE SOLUTION WILL BE UTILISED AND ALREADY HAS AN AGREED SECTION 104 IN PLACE



**SOIL SPECIFICATION AS MODELLED FOR HYDRAULIC PERFORMANCE**

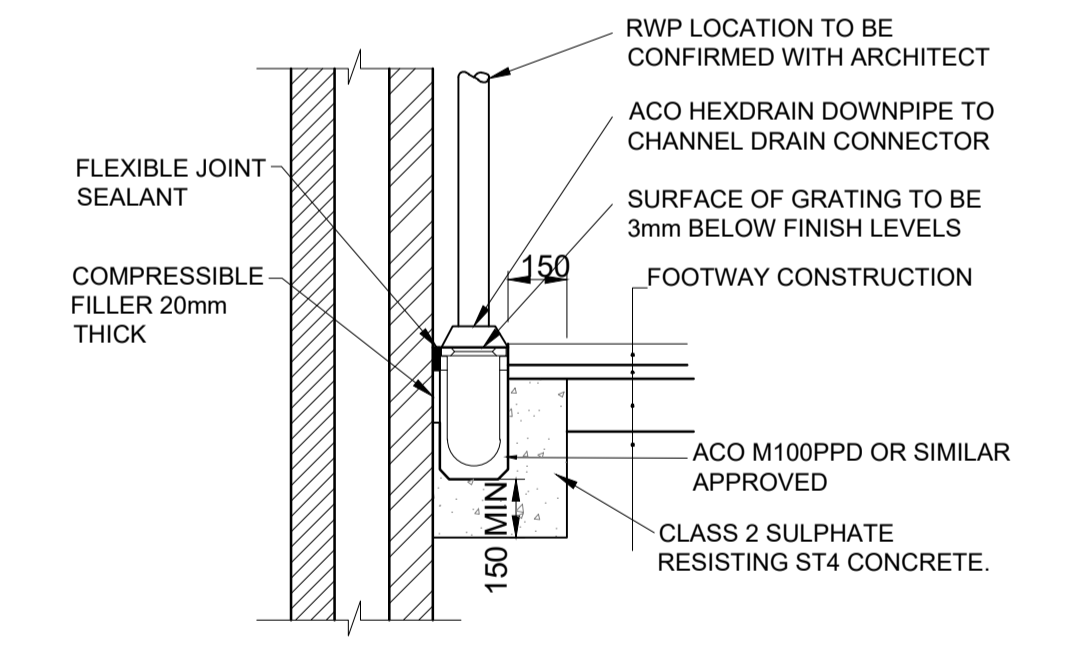
**PLANTING LAYER**  
CARDIFF SAB TEAM TO CONFIRM LOCAL SOIL SPEC - CONTRACTOR TO ALLOW FOR IMPORTED SOIL

**DRAINAGE LAYER**  
HYDRAULIC CONDUCTIVITY: 300m/hr  
POROSITY: 30%

**OTHER SOIL SPECIFICATION PARAMETERS TO BE APPROPRIATE FOR RAINGARDEN PLANTING SPECIES TO RAINGARDENS AND IN ACCORDANCE WITH CIRIA SUDS MANUAL BOX 18.1 CRITERIA.**

**ONSITE SOIL TO BE TESTED IN ADVANCE IF INTENDED FOR RE USE.**

**RAINGARDEN SECTION VIEW**  
SCALE - NTS



**NOTES:**

1. DRAINAGE CHANNELS TO BE ACO M200PPD OR SIMILAR APPROVED
2. FOUNDATION FOR CHANNELS TO BE LAID ON A ROLLED SUB-BASE OF 150mm MINIMUM THICKNESS.
3. GRATING LOAD CLASSIFICATION TO BE C250/ D400
4. RWP'S TO HAVE ACO HEXDRAIN CONNECTORS TO CHANNEL GRATINGS - REFER TO MANUFACTURERS GUIDELINES

**RWP OUTLETS TO LINEAR DRAIN DETAIL**  
SCALE - NTS

PROMINENT COMMUNITY RAIN GARDEN / RAIN PARK ALONG FRONT OF SITE WITH INTEGRATED WET DETENTION SUDS FEATURES



ROADSIDE RAINGARDENS / BIO-RETENTION POCKETS INTEGRATED THROUGHOUT TO DIRECTLY RECEIVE HIGHWAY RUNOFF, PROVIDE SOURCE CONTROL & TREATMENT TRAIN THROUGH THE SITE



P4	WBN FOUL RUN CHANGED COLOUR	NC	RE	13.09.24
P3	UPDATED TREE CONSTRAINTS PLAN	RE	RE	22.07.24
P2	UPDATED SITE LAYOUT	RE	RE	24.05.24
P1	FIRST ISSUE	RE	RE	22.04.24
REV	DESCRIPTION	BY	CHK	DATE

**GRAYS CONSULTING ENGINEERS**  
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CLIENT: **WATES**

PROJECT TITLE: **WILLOWBROOK SOUTH**

DRAWING TITLE: **DRAINAGE STRATEGY**

DRAWN	CHECKED	APPROVED	DATE	SHEET SIZE/SCALE	GRAYS JOB No.
NC	RE	RM	02.04.2024	1:500@A1	10156

SUITABILITY: **S0** REVISION: **P4**  
DRAWING NUMBER: **10156-GRY-XX-XX-DR-C-002**