

- DRAINAGE NOTES**
- DRAWING ISSUED FOR PLANNING PURPOSES ONLY. FURTHER TO APPROVAL FROM PLANNING, LOCAL AUTHORITY, SEWERAGE UNDERTAKER, ENVIRONMENT AGENCY AND ANY OTHER GOVERNING PARTIES. FOLLOWING RECEIPT OF FURTHER INFORMATION AND COMMENTS THE SCHEME MAY BE REVISED.
 - ALL SETTING OUT IS TO BE BASED ON ARCHITECT'S INFORMATION UNLESS OTHERWISE STATED.
 - THE LOCATION AND LEVEL OF ALL EXISTING SERVICES ARE TO BE IDENTIFIED PRIOR TO CONSTRUCTION AND THE ENGINEER ADVISED OF ANY CLASHES.
 - ALL EXTERNAL DRAINAGE WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH DESIGN AND CONSTRUCTION GUIDANCE TOGETHER WITH THE SEWERAGE UNDERTAKES REQUIREMENTS.
 - S106 / S104 APPROVAL REQUIRED PRIOR TO ANY CONNECTIONS WORKS TO PUBLIC SEWER.
 - ALL CONCRETE TO DRAINAGE, MANHOLE BASES, SURROUNDS ETC. TO BE IN ACCORDANCE WITH THE BRE SPECIAL DIGEST 1 - CONCRETE IN AGGRESSIVE GROUND. REFER TO SITE INVESTIGATION REPORT FOR SULPHATE REQUIREMENTS.
 - ALL PIPES SHALL BE CLAY TO BS EN 295 OR CONCRETE TO BS 5911 UNLESS OTHERWISE STATED. PLASTIC PIPES MAY BE USED SUBJECT TO THE APPROVAL OF THE SEWERAGE UNDERTAKER AND SUITABILITY OF GROUND CONDITIONS.
 - DRAINAGE LAID BENEATH ROADS AND CAR PARKS WITH LESS THAN 1200mm OF COVER TO HAVE REINFORCED CONCRETE SLAB INSTALLED ABOVE TO PROVIDE PROTECTION MEASURES. ALL OTHER DRAINAGE WITH LESS THAN 800mm OF COVER TO BE SIMILARLY TREATED.
 - RIGID PIPES SHOULD BE BEDDED ON CLASS S GRANULAR BEDDING UNLESS COVER IS LESS THAN 1.2m IN TRAFFICKED AREAS AND LESS THAN 900mm IN SOFT AREAS, THEN CLASS 2 CONCRETE BEDDING TO BE USED.
 - NO SEWER SHOULD BE LAID LOWER THAN A 45 DEGREE LINE DRAWN FROM THE BOTTOM CORNER OF AN ADJACENT FOUNDATION, WHERE PIPE FALLS WITHIN ZONE OF INFLUENCE FOUNDATIONS TO BE REVIEWED TO PREVENT ANY LOADING ON PIPE WORK.
 - ALL GULLIES, REST BENDS, RODDING EYES, ETC. TO BE SURROUNDED BY MASS CONCRETE S14. DRAINAGE TO BE INSTALLED AND TESTED STRICTLY IN ACCORDANCE WITH THE MANUFACTURERS PRINTED INSTRUCTIONS, BS EN 752, BS 8000 AND LOCAL AUTHORITY BYLAWS.
 - ALL BRANCHES TO MAIN DRAINS TO BE SET AT 135° LONG RADIUS BENDS USED THROUGHOUT. ALL TAPERS AND REDUCERS ALONG THE HORIZONTAL PLANE TO BE LEVEL SOFFITS.
 - ALL FOUL WATER RUNS BELOW BUILDING TO HAVE RODDABLE ACCESS POINTS AT OUTLET LOCATIONS ABOVE FLOOR SLAB.
 - ON COMPLETION OF THE DRAINAGE WORKS (OR SECTIONS OF THE WORKS) THE CONTRACTOR TO SURVEY ALL PIPEWORK (ROLLING BALL TEST, CCTV AND PROVIDE RECORDS TO DEMONSTRATE THAT THE PIPEWORK FALL IN THE DESIGNED DIRECTION, IS STRAIGHT AND ROUNDED AND THAT NO OBSTRUCTIONS ARE PRESENT.
 - ALL FOUL WATER MANHOLE COVERS TO BE SEALED TO PREVENT INGRESS OF SURFACE WATER AND EGRESS OF FOUL ODOURS.
 - ALL DRAINAGE SYSTEMS TO BE CLEANED OUT PRIOR TO HANDOVER INCLUDING CATCHPITS, PERMEABLE SURFACES, SUMPS, INTERCEPTORS, CHANNELS AND MAINTENANCE OF ALL MOTORS, PUMPS AND ALARMS. DEBRIS SHOULD BE PREVENTED FROM ENTERING THE DRAINAGE NETWORK.
 - DRAINAGE CHANNEL DESIGN TO BE UNDERTAKEN BY MANUFACTURER PRIOR TO CONSTRUCTION.
 - ALL MANHOLE AND DRAINAGE CHANNEL COVERS SHALL COMPLY WITH BS EN 124. MANHOLE COVERS WITHIN BLOCK PAVED AREAS AND BUILDINGS SHALL BE RECESSED.
 - VENTILATION SHALL BE PROVIDED AT THE HEAD OF FOUL DRAINAGE. ACCESS FOR RODDING / JETTING SHALL BE PROVIDED TO ALL SOIL AND RAINWATER DOWNPIPES ABOVE FINISHED FLOOR LEVEL.
 - FOR SETTING OUT OF SOIL AND RAINWATER DOWNPIPES SEE ARCHITECT'S DRAWINGS.
 - ALL PIPES WITHIN THE BUILDING FOOTPRINT ARE TO BE A MINIMUM OF 100mm AND TO BE LAID AT A GRADIENT AT LEAST 1:40 UNLESS STATED OTHERWISE ON THIS DRAWING.
 - ADDITIONAL DRAINAGE MAY CROSS THE SITE AND DUE TO CHANGES IN LEGISLATION IN OCTOBER 2011, THESE FORMER PRIVATE SEWERS MAY NOW BE THE RESPONSIBILITY OF THE SEWERAGE UNDERTAKER, BUT MAY NOT BE SHOWN ON THEIR RECORDS.
 - COVERS SHALL BE ADJUSTED TO MATCH SURROUNDING FINISH LEVELS.
 - THE CONTRACTOR SHALL PROTECT EXISTING BURIED PIPES AND TREE ROOTS FROM DAMAGE CAUSED BY LOADS IMPOSED BY CONSTRUCTION PLANT.
 - LEVELS OF EXISTING DRAINAGE TO BE CHECKED AND CONFIRMED TO THE ENGINEER PRIOR TO STARTING DRAINAGE WORKS.
 - ALL ROADS SHALL BE DRAINED BY TRAPPED GULLIES OR KERB CHANNEL UNITS. ALL BUILDING EXTERNAL AREAS SHALL BE DRAINED BY TRAPPED GULLIES OR CHANNEL UNITS. RUNOFF FROM ALL EXTERNAL SERVICE YARDS SHALL BE TREATED EITHER VIA PETROL/OIL INTERCEPTOR OR SUSTAINABLE DRAINAGE METHODS AS APPROPRIATE PRIOR TO DISCHARGE.
 - ANY FIELD DRAINAGE AFFECTED BY THE WORKS SHALL BE MADE GOOD AND OUTFALLS MAINTAINED.
 - SHOULD ANY SEWER BE FOUND DURING CONSTRUCTION WORKS, AN INVESTIGATION OF THE SEWER WILL BE REQUIRED TO ASCERTAIN ITS CONDITION, THE NUMBER OF PROPERTIES SERVED, AND POTENTIAL MEANS OF ACCESS BEFORE ANY FURTHER WORKS COMMENCE ON SITE DRAINAGE WORKS TO START AT THE OUTFALL CONNECTION AND WORK UPSTREAM.
 - ANY DISCREPANCIES OF EXISTING INVERT LEVELS TO BE REPORTED IMMEDIATELY AS THIS MAY ALTER THE DESIGN.
 - THE CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING ALL TIE-INS FOR LINE AND LEVEL WITH EXISTING FOUL AND SURFACE WATER SYSTEMS BEFORE COMMENCING ANY WORKS.
 - ALL DRAINAGE WORK IS TO BE STRICTLY IN ACCORDANCE WITH THE REQUIREMENTS OF THE 'BUILDING REGULATIONS 2015, PARTICULARLY PART H, 'DRAINAGE AND WASTE DISPOSAL'.
 - ALL EXISTING LAND DRAINS ENCOUNTERED ON SITE DURING CONSTRUCTION ARE TO BE RE-CONNECTED.
 - TEMPORARY PROTECTION TO BE PROVIDED TO DRAINAGE WORK DURING CONSTRUCTION AS NECESSARY.

- PRIOR TO COMMENCING WORK ON THE DRAINAGE, ALL EXISTING DRAINS, SEWERS, MANHOLES AND OUTFALLS TO REMAIN SHALL BE LOCATED, IDENTIFIED AND A CCTV CONDITION SURVEY CARRIED OUT, WHERE NECESSARY, PROTECTION TO THE EXISTING DRAINAGE INFRASTRUCTURE SHALL BE PROVIDED.
- ALL EXISTING SEWERS AND MANHOLES ABANDONED DUE TO THE PROPOSED WORKS ARE TO BE EITHER REMOVED, AND SUITABLY BACKFILLED OR GROUTED UP.
- ALL PIPES TO BE 100 OR 110MM DIA. AND LAID AT 1 IN 80 UNLESS STATED OTHERWISE.
- ALL CONCRETE IS TO BE IN ACCORDANCE WITH BS EN 206-1, BS 8500 AND THE RECOMMENDATIONS OF BRE SPECIAL DIGEST (CONCRETE IN AGGRESSIVE GROUND), UNLESS SPECIFIED OTHERWISE, IN SITU CONCRETE SHALL BE DESIGNATED MIX GEN 3 (GRADE C20), OR AN EQUIVALENT MIX SUBJECT TO THE APPROVAL OF THE ENGINEER.
- THE FOLLOWING TYPES OF PIPE MAY BE USED UNLESS NOTED OR AGREED OTHERWISE:
 - PIPES UP TO 300MM DIAMETER TO BE STRUCTURED WALLED TO BS EN 13476, POLYPROPYLENE TO BS EN 1852, PVC-U TO BS EN 1401 OR VITRIFIED CLAY TO BS EN 295.
 - PIPES OVER 300MM DIAMETER TO BE CONCRETE TO BS 5911, STRUCTURED WALLED TO BS EN 13476, POLYPROPYLENE TO BS EN 1852 OR PVC-U TO BS EN 1401.
- BOTH CLAY AND CONCRETE PIPES SHALL BE STRENGTH CLASS 120 (100/150MM MIN CRUSHING STRENGTH 28KN/M), THERMOPLASTIC PIPES SHALL HAVE A MINIMUM RING STIFFNESS OF SN4.
- PIPES WHICH RUN ADJACENT TO BUILDINGS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH PART H, CLAUSES 2.23 TO 2.25, DIAGRAMS 7 AND 8 ARE OF PARTICULAR RELEVANCE AND SHALL BE COMPLIED WITH.
- PIPES PENETRATING WALLS:
 - AN OPENING IS TO BE FORMED THROUGH WALLS TO GIVE PIPES AT LEAST 50MM CLEARANCE ALL ROUND. BRICKWORK OVER SHALL BE SUPPORTED BY A LINTEL.
 - OPENINGS TO BE MASKED EACH SIDE WITH RIGID SHEET MATERIAL. PIPES EMBEDDED IN WALLS SHALL HAVE JOINTS FORMED WITHIN 150MM OF EITHER WALL FACE. ADJACENT ROCKER PIPES OF MAX 600MM LENGTH WITH FLEXIBLE JOINTS SHALL CONTINUE THE PIPEWORK.
- ALL PIPES BENEATH BUILDINGS TO BE B4S IN CONCRETE, WHERE COVER IS LESS THAN 300MM THE CONCRETE IS TO BE CAST INTEGRALLY WITH THE FLOOR SLAB.
- ALL DRAINS IN THE VICINITY OF EXISTING OR PROPOSED TREES TO BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF NBS3 PRACTICE NOTE 3.
- VENTILATION SHALL BE PROVIDED AT THE HEAD OF THE FOUL DRAINAGE RUNS.
- THE FIRST FLEXIBLE JOINT IN PIPES ADJOINING A MANHOLE SHALL BE A MAXIMUM LENGTH OF 600MM FROM THE INSIDE FACE OF THE MANHOLE, CONNECTING TO A ROCKER PIPE. THE LENGTH OF THE ROCKER PIPE SHALL BE AS FOLLOWS:

PIPE DIA	LENGTH OF ROCKER PIPE
150-600MM	600MM
675-750MM	1000MM
OVER 750MM	1250MM

- ALL MANHOLES AND INSPECTION CHAMBERS SITUATED IN AREAS SUBJECT TO VEHICULAR LOADING TO HAVE CLASS D400 COVERS AND FRAMES TO BS EN 124 AND THOSE NOT SUBJECT TO VEHICULAR LOADING MAY HAVE CLASS B125 COVERS AND FRAMES.
- MANHOLES LOCATED WITHIN BLOCK PAVED AREAS TO HAVE 150MM DEEP COVER FRAMES AND BEDDED SUITABLE FOR THE SIZE OF BLOCKS IN USE. THE CONCRETE HAUCHING IS NOT TO BE BROKEN OUT TO ALLOW FOR BLOCK PAVING INSTALLATION. DRAINAGE FRAMES MUST BE TIED TO MANHOLE RISERS BY USE OF MANUFACTURERS TIES (E.G. POLYPIPE REF FRK500 FIXING KIT AND FRK501 BLACK TIES). THE GROUND WORKS CONTRACTOR/TOILY RESPONSIBLE FOR ANY ACCIDENTS DUE TO INCORRECT FITTING OR FAILURE TO USE THE CORRECT MANUFACTURERS FIXING EQUIPMENT.
- COVER LEVELS FOR MANHOLES ARE APPROXIMATE ONLY AND SHOULD BE ADJUSTED TO MATCH SURROUNDING LEVELS.
- ALL WORKS TO SEWERS/ MANHOLES BEING OFFERED FOR ADOPTION OR ON EXISTING PUBLIC SEWERS SHOULD BE IN ACCORDANCE WITH 'SEWERS FOR ADOPTION, CURRENT EDITION' AND THE ADOPTING WATER AUTHORITY'S RECOMMENDATIONS.
- REQUIREMENT FOR LAND DRAINS TO BE ASSESSED ON SITE BY THE SITE MANAGER.
- ROAD GULLIES SHALL BE TRAPPED 4500 X 900MM DEEP WITH CLASS S 400 FRAME AND GRATING TO BS EN 124.
- ALL MANHOLES, PIPE TRENCHES ETC. TO BE BACKFILLED WITH IMPORTED GRANULAR FILL TO CLASS 6F1/4F5 (CAPPING MATERIAL) TO (SHW) TABLE 6/1 & COMPACTED IN ACCORDANCE WITH TABLE 6/4.
- ALL PIPELINES SHALL BE TESTED BOTH BEFORE AND AFTER BACKFILLING, USING EITHER AIR TEST OR WATER TEST, IN ACCORDANCE WITH BS EN 1610.
- ALL PIPES, CHAMBERS AND FITTINGS SHALL BE BEDDED AND BACKFILLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS SUBJECT TO THE FOLLOWING MINIMUM REQUIREMENTS TABLE.

Location	Cover to crown	Bedding Clay/Concrete Pipe	Bedding Plastic Pipe	Backfill
Roads (HGV)	>1.2m	Class S	Class S (S102)	Type 1 Granular
Drives / car parking	>0.9m	Class S (Concrete)	Class S (S102)	Type 1 Granular
Hard and soft Landscaping	<0.6m	Class S (Concrete)	Class S (S102)	Stable as dug material

KEY

- SITE BOUNDARY
- LAND BOUNDARY TO BE TRANSFERRED TO ICOSA
- S104 SURFACE WATER SEWER AND MANHOLE
- SURFACE WATER GULLY
- S104 FOUL WATER SEWER AND MANHOLE
- EASEMENT
- HEADWALL
- FOUL WATER LATERAL
- SURFACE WATER LATERAL
- PROPOSED FLOW CONTROL CHAMBER
- FOUL WATER RISING MAIN
- CELLULAR ATTENUATION TANK
- PERMEABLE BLOCK PAVING CONSTRUCTION REFER TO DRAINING NO HTF-PPC-00-XX-DR-C-1150 FOR FURTHER DETAILS

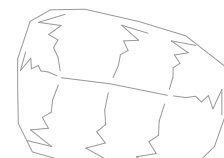
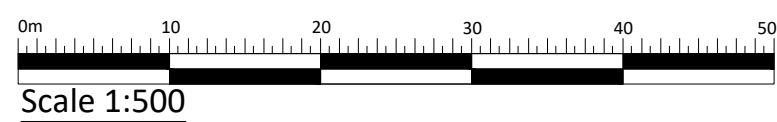
ICOSA WATER ACCEPT THE USE OF PLASTIC PIPES IN ADOPTABLE SEWERS, PROVIDED THEY COMPLY WITH THE FOLLOWING STANDARDS:-

- SOLID WALL PVC-U TO BS EN 1401
- SPIRAL WOUND WELDED HDPE TO EN 13476 PARTS 1 & 2
- STRUCTURE-WALL THERMOPLASTIC TO EN 13476 PARTS 1 & 3
- POLYPROPYLENE TO BS EN 1852/ICOSA WATER DO NOT HAVE A SPECIFIC MAXIMUM JETTING PRESSURE FOR ADOPTABLE PIPELINES.

PROVIDED THAT THE PIPES COMPLY WITH THE ABOVE STANDARDS, THEN THEY ARE DEEMED ACCEPTABLE.

ICOSA WATER RECOMMEND THAT PARTICULAR CARE IS TAKEN WHEN LAYING PLASTIC PIPES TO ENSURE THAT

THE BED AND SURROUND IS WELL COMPACTED, PARTICULARLY AT THE SPRINGING POINT OF THE PIPES. THIS WILL ENSURE ADEQUATE SUPPORT TO PREVENT COMPRESSION OF THE PIPE UNDER LOAD. A CHECK FOR COMPACTION WILL BE MADE WHEN VIEWING THE CCTV SURVEY.



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BED LEVEL - 106.30m
MAX TOP WATER LEVEL - 107.60m
TOP OF FREEBOARD LEVEL - 108.30m
FREEBOARD DEPTH - 700mm
APPROX WATER VOLUME - 111m³
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APPROX WATER VOLUME - 111m³
APPROX POND VOLUME - 270m³
1.3 BANKS

ATTENUATION BASIN
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