



GENERAL NOTES:

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
- DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
- ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
- FOR GENERAL NOTES REFER TO DRAWING.
- DESIGN BASED ON TOPOGRAPHICAL SURVEY INFORMATION AVAILABLE AT THE TIME OF DESIGN. ANY VARIANCE FROM THE INFORMATION SHOWN SHOULD BE REPORTED TO THE ENGINEER FOR REVIEW.
- NOT TO BE USED FOR CONSTRUCTION, FOR COORDINATION ONLY.
- EXISTING DRAINAGE SHOWN INDICATIVE FROM HISTORIC PLANS. ALL EXISTING CONNECTIONS TO BE CONFIRMED BY CCTV.

KEY

- RED LINE BOUNDARY
- EXISTING DRAINAGE NETWORK
- PROPOSED COMBINED DRAINAGE
- EXISTING WELSH WATER ASSETS
- PRIVATE SW SEWER
- PRIVATE FW SEWER
- PROPOSED ROAD GULLY
- EXISTING ROAD GULLY - CONNECT TO NEW NETWORK
- SURFACE WATER ATTENUATION TANK 340 m² x 1.5m HEIGHT
- DRY DETENTION BASIN
- DARK GREEN - 1 in 5
- LIGHT GREEN - 1 in 10
- BLUE - BASE REQUIREMENT 'WETLAND' PLANTING
- PROPOSED SLOT DRAIN
- PERFORATED PIPE WITHIN PERMEABLE PAVING

OTHER DISCIPLINE DRAWING REFERENCES

THE DESIGN OF THIS SCHEME HAS BEEN DESIGNED IN ACCORDANCE WITH THE BELOW DRAWINGS AND INFORMATION

TOPOGRAPHICAL SURVEY REF: TOWER SURVEYS R\N9891_201-202_18m01

ARCHITECTS DRAWING REF: GDA NDCH-GDA-01-00-DR-A-25_80-001_P02

LANDSCAPE ARCHITECTS DRAWING REF: GDA NDCH-GDA-00-22-DR-A-10_35-004_P05

OTHER DRAWINGS REF: ROOF AREAS - NDCH-GDA-01-22-DR-A-20_05-001_P02 EX-05 EXISTING SITE PLAN (1997) DRAINAGE LAYOUT

DESIGN PHILOSOPHY

SURFACE WATER DESIGN
THE DESIGN PROVIDES CAPACITY UP TO THE 100 YEAR STORM WITH MINOR CONTROLLED EXCEEDANCE DURING THE 100 YEAR + 40% CLIMATE CHANGE EVENT.
SW FLOW RATE: 5.6 L/S (BASED ON GREENFIELD RATE)
APPROXIMATE STORAGE TANK REQUIREMENT: 485m³
OUTFALL: WW SEWER (TO BE AGREED WITH WW AND SAGI) LEVELS INDICATE THAT PUMPING WILL NOT BE REQUIRED. TBC FOLLOWING FURTHER DESIGN AND SURVEY WORK.
POLLUTION TREATMENT: PERMEABLE PAVING TO CAR PARK INFILTRATION IS NOT CONSIDERED APPROPRIATE FOR THIS SCHEME. TESTING TO BE DIGEST 365 ARE REQUIRED TO CONFIRM INFILTRATION RATES FOR DESIGN.

FOUL WATER DESIGN
INTERNAL POP-UPS TO BE ACCESSIBLE FROM ABOVE SLAB LEVEL THROUGH ROOFING EYE. NO INTERNAL CHAMBERS / ALL CONNECTIONS BELOW SLAB TO BE BLIND. DRAINAGE TO PASS BELOW GROUND BEAM AT BUILDING EXENTS.
OUTFALL TO EXISTING WW NETWORK. APPROVED IN PRINCIPLE FOR ANTICIPATED FLOWS FROM DEVELOPMENT.

P03	NOTATION ADDED (S4)	06/04/20	NIB	JDB
P02	STAGE 3 (S4)	03/04/20	JDB	AF
P01	WIP (S0)	27/03/20	JDB	-
Rev	Description	Date	By	Chkd
11.55 Tinsam Street, Liverpool, L2 2SB 0151 709 3889 liverpool@curtins.com www.curtins.com				
Status: SUITABLE FOR STAGE APPROVAL				
Project: ROYAL ALEXANDRA HOSPITAL, RHYL				
Dwg Title: DRAINAGE PROPOSED DRAINAGE STRATEGY				
Size:	Date:	Drawn By:	Designed By:	Checked By:
AO	27/03/2020	JDB	JDB	AF
Scale: 1:200				
Project No:	Originator	Volume	Level	Type
NDCH - CUR - ZZ - XX - DR - C - 50.10-1001 - P03				

Size:	Date:	Drawn By:	Designed By:	Checked By:
AO	27/03/2020	JDB	JDB	AF
Scale: 1:200				
Project No:	Originator	Volume	Level	Type
NDCH - CUR - ZZ - XX - DR - C - 50.10-1001 - P03				

DRAINAGE NOTES:

- ALL ADAPTABLE DRAINAGE WORKS INCLUDING WORKS TO EXISTING PUBLIC SEWERS TO BE UNDERTAKEN IN ACCORDANCE WITH "SEWERS FOR ADOPTION 8th EDITION" AND "CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY 7th EDITION", BS EN 752 2017 "DRAIN AND SEWER SYSTEMS OUTSIDE BUILDINGS" AND THE BUILDING REGULATIONS APPROVED DOCUMENT H.
- ALL PRIVATE DRAINAGE WORKS TO BE IN ACCORDANCE WITH CURTINS DRAINAGE SPECIFICATION, "CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY 7th EDITION", BS EN 752 2017 "DRAIN AND SEWER SYSTEMS OUTSIDE BUILDINGS" AND THE BUILDING REGULATIONS APPROVED DOCUMENT H.
- DESIGN BASED ON TOPOGRAPHICAL SURVEY AND CCTV SURVEY INFORMATION AVAILABLE AT THE TIME OF THE DESIGN.
- OUTFALL CONNECTION(S) SUBJECT TO AGREEMENT WITH THE APPROVING AUTHORITY.
- COVER LEVELS, GULLY POSITIONS, AND BUILDINGS LOCATION ARE APPROXIMATE AND SHALL BE CONFIRMED BY ARCHITECT/ LANDSCAPE ARCHITECT. CONTRACTOR TO ALLOW FOR ADJUSTMENT TO SUIT AGREED POSITIONS AND FINISHED LEVELS, AND CONFIRM ALL COVER LEVELS ON SITE.
- ALL INTERNAL DRAINAGE CONNECTIONS ARE PROVIDED TO THE PENETRATION POSITIONS SHOWN ON ARCHITECT AND M&E DRAWINGS. REFER TO DIMENSIONED LOCATIONS AND DIMETERS ON ARCHITECTS GROUND FLOOR SETTING-OUT PLANS.
- ALL UNDERGROUND FOUL DRAINAGE SHOULD BE SUITABLY VENTED AT OR NEAR TO THE HEAD OF RUNS.
- ALL ACCESS FITTINGS, STACKS, R/WPS AND GULLIES TO BE RODDABLE. ALL TO HAVE LOW LEVEL RODDING ACCESS PLATES UNLESS AN ALTERNATIVE MEANS OF ACCESS IS AGREED. ACCESS POINT TO BE ABOVE ANY GROUND FLOOR CONNECTED APPLIANCE SPILL LEVEL.
- LARGE ACCESS FITTING REQUIRED ABOVE GROUND WHERE GREATER THAN 12M UP TO 22M TO A JUNCTION. SMALL ACCESS FITTING REQUIRED UP TO 12M TO A JUNCTION.
- ALL GULLY AND CHANNEL DRAIN OUTLETS AND TERMINATION POINTS TO BE TRAPPED AND RODDABLE. INTERNAL GULLIES AND CHANNEL DRAINS TO BE SPECIFIED BY OTHERS.
- WHERE NO W/C'S ARE CONNECTED UPSTREAM, UNDERSLAB FW DRAINAGE TO BE LAID AT 1:40 MIN. AFTER THE CONNECTION OF AT LEAST TWO W/C, A MIN. FALL OF 1:80 APPLIES.
- ALL CONNECTIONS FROM POP-UPS TO BE LAID AT A CONSTANT GRADIENT TO JUNCTION/ INSPECTION CHAMBER MANHOLE UNLESS NOTED OTHERWISE. ANY ISSUES RELATING TO CLASSES WITH FOUNDATIONS ARE TO BE FORWARDED TO THE ENGINEER, ALLOWING SUFFICIENT TIME FOR AN ALTERNATIVE SOLUTION TO BE PROVIDED.
- INVERT LEVELS AT MANHOLES/ INSPECTION CHAMBERS TO BE USED TO SET OUT PIPEWORK. PIPE GRADIENTS ARE SHOWN INDICATIVELY ONLY.
- ALL PIPE DIAMETERS GIVEN ARE NOMINAL INTERNAL PIPE DIAMETERS.
- ALL SEWERS UNLESS AGREED OTHERWISE STATED, SHALL BE:
 - FW TO BE PVC.
 - SW 100mm ID 225mm TO BE VITRIFIED CLAY.
 - 300mm DIA AND GREATER TO BE CLASS 120 CONCRETE PIPES.
- AS AN ALTERNATIVE THE CONTRACTOR MAY USE AN APPROVED UNPLASTICISED POLYVINYL CHLORIDE (PVCU) WITH APPROVAL FROM THE ENGINEER.
- SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS.
- THE FIRST PIPE OUT OF MANHOLES TO BE AS SHORT AS PRACTICABLE SO AS TO PROVIDE A FLEXIBLE JOINT AS CLOSE AS POSSIBLE TO THE OUTSIDE FACE OF THE CONCRETE SURROUND AND CONNECTED TO A LENGTH OF ROCKER PIPE.
- ALL NEW CONNECTIONS INTO EXISTING MANHOLES (OR INTO EXISTING SEWERS) TO BE SOFFITS LEVEL UNLESS OTHERWISE NOTED.
- ALL ADAPTABLE DRAINAGE PIPES WILL REQUIRE A MINIMUM OF 1200mm COVER. IN ACCORDANCE WITH SEWAGE UNDERTAKERS REQUIREMENTS. WHERE THIS IS NOT ACHIEVED, IT WILL BE

NECESSARY TO AGREE THE BED AND SURROUND DETAIL.

- ALL PRIVATE DRAINAGE PIPES WITH A COVER OF LESS THAN 600mm IN NON-TRAFFICKED AREAS AND LESS THAN 1200mm IN TRAFFICKED AREAS TO BE BEDDED AND SURROUNDED IN CONCRETE (CLASS Z). COMPRESSIBLE MATERIAL SHALL BE PROVIDED AT EVERY PIPE JOINT. WHERE COVER EXCEEDS THIS DEPTH, PIPES ARE TYPICALLY BEDDED AND SURROUNDED IN CLASS S. REFER TO PIPE EMBEDMENT DETAILS DRAWING FOR SPECIFIC TYPES.
- WHERE DRAINAGE PIPES ARE LESS THAN 300mm BELOW THE UNDERSIDE OF THE GROUND FLOOR SLAB, CONCRETE ENCASEMENT IS REQUIRED (CLASS Z). COMPRESSIBLE JOINTS ARE TO BE PROVIDED AT EVERY PIPE JOINT WITHIN THE CONCRETE.
- WHERE PIPES ARE MORE THAN 300mm BELOW THE UNDERSIDE OF THE SLAB, CLASS S BEDDING IS ACCEPTABLE.
- SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED TO PROVE THAT SUCH PRECAUTIONS ARE NOT REQUIRED.
- WHERE PEAT IS ENCOUNTERED DURING THE SITE INVESTIGATION, ADDITIONAL NOTES WILL BE REQUIRED AND DESIGN ADJUSTED TO SUIT.
- WHERE FOUL SEWERS RUN ABOVE SURFACE SEWERS, CONCRETE PROTECTION MAY BE REQUIRED AT CROSSEOVERS TO PREVENT ANY POTENTIAL CONTAMINATION.
- ALL CONNECTIONS PASSING THROUGH BASES OR EDGE BEAMS TO BE IN SEALED SLEEVES. ALTERNATIVELY CONNECTIONS MAY BE CAST-IN WITH FLEXIBLE JOINTS NOT GREATER THAN 150MM FROM FACE OF CONCRETE.
- THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION MAY NEED TO BE INCREASED TO ACCOMMODATE THE CONNECTIONS AND BENDS.
- ALL MANHOLE COVERS IN BLOCKSLAB AND EXTERNAL PAVING AREAS TO HAVE RECESSED COVERS OF THE APPROPRIATE GRADE TO ACCEPT ARCHITECT'S PAVING PROPOSAL.
- ALL INTERNAL COVERS TO HAVE MECHANICALLY JOINTED CORNERS AND DOUBLE SEALED WITH RECESSED TRAY TO ALLOW FOR FINISHES.
- UNLESS NOTED OTHERWISE IN THE MANHOLE SCHEDULE, ALL MANHOLE, GULLY AND CHANNEL COVERS (IRONWORK) SHOULD BE THE FOLLOWING SPECIFICATION:
 - B/125 LOAD CLASS IN PEDESTRIAN AREAS.
 - D400 LOAD CLASS IN VEHICULAR AREAS.
- ALL PROPRIETARY PRODUCTS TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS, INSTRUCTIONS AND RECOMMENDATIONS.
- GREASE TRAPS SHOULD BE PROVIDED ABOVE GROUND WITHIN AN ENZYME TREATMENT SYSTEM BY APPROPRIATE SPECIALIST DESIGNER. WHERE A BELOW GROUND GREASE TREATMENT SYSTEM IS REQUIRED - ADDITIONAL NOTES REQUIRED AND DESIGN ADJUSTED TO SUIT.
- THE DESIGN IS BASED ON A GRAVITY RAINWATER SYSTEM, WHERE A SIPHONIC SYSTEM IS PROPOSED ADDITIONAL NOTES REQUIRED AND DESIGN ADJUSTED TO SUIT.
- INTERNAL DRAINAGE (BELOW SLAB) TO BE 150mm DIA WHERE MORE THAN 1 CONNECTION AND 100mm DIA WHERE SINGLE CONNECTION.
- ALL RWP CONNECTIONS ASSUMED TO BE 100mm DIA PENDING DETAILED DESIGN BY SPECIALIST ROOF DESIGNER.
- PROPOSED FOUL BELOW SLAB DRAINAGE TO BE RATIONALISED AT STAGE 4.

INFORMATION REQUIRED SCHEDULE

- UPDATED CCTV DRAINAGE SURVEY WITH CONFIRMATION OF EXISTING WELSH WATER DRAINAGE ASSET LEVELS.
- UPDATED TOPOGRAPHICAL SURVEY TO INCLUDE CAR PARK TO WEST.
- INFILTRATION TESTING TO BRE 365

RESIDUAL HAZARD REGISTER (RELATES TO CIVIL/STRUCTURAL MATTERS ONLY)		
MUST BE READ IN CONJUNCTION WITH CURTINS RESIDUAL HAZARD REGISTER NDCH-CUR-XX-XX-HA-Z-00_10-001.		
HAZARDS THAT SHOULD BE OBVIOUS TO A COMPETENT CONTRACTOR HAVE NOT BEEN INDICATED ON THIS DRAWING. SHOULD ANY ADDITIONAL HAZARDS BE IDENTIFIED, THE CONTRACTOR SHOULD NOTIFY ALL		
HAZARD REF. No.	ITEM (FEATURE, ELEMENT OR ACTIVITY)	RESIDUAL HAZARD
1.1	Services within existing highway	Damage to or striking of existing services. Concrete protection may be required.
1.2	Drainage connections	Unable to connect SW and FW on site drainage to Welsh Water sewers.
2.1	Existing structures	Damage to existing listed building.
2.2	Varying ground conditions	Potential for unexpected ground conditions such as unstable ground.
2.3	Groundwater	Attenuation tank may require weighting to resist floatation.
3.1	Buried Services	Operatives exposure to live services during excavation works.
4.1	Earthworks & excavations	Potential for undermining of existing structure due to excavation works.
5.1	Ground contamination	Operatives exposure to ground contamination.

MAXIMUM PERMISSIBLE DRAIN DOWN RATE FROM SPRINKLER TANKS TO BE 5 l/s INTO SW NETWORK. TANKS NOT TO BE EMPTIED DURING HEAVY RAINFALL EVENTS.

PROPOSED ATTENUATION FEATURE: ATTENUATION REQUIRED = 485m³. DEPTH = 1.5m. CELLULAR STORAGE 95% VOID RATIO. BASE IL = 5.327m AOD. TANK TO MEET REQUIREMENTS OF CIRIA C880

SHALLOW DRY DETENTION BASIN. MAX SIDE SLOPE = 1 in 5 (DARK GREEN). UTILISED DURING 100+CC STORM EVENT ONLY. MAX WATER DEPTH = 300mm

NEW MH CONSTRUCTED ON EXISTING CONNECTION INTO SITE. IL TO BE CONFIRMED. IF INSUFFICIENT DEPTH TO EXISTING MH THEN NEW CONNECTION REQUIRED TO WW SEWER WITHIN RUSSELL ROAD.

NEW MH CONSTRUCTED ON EXISTING WW SEWER. NO INVERT INFORMATION AVAILABLE. TBC. MH SUBJECT TO S106 AGREEMENT WITH WW. MAX SW FLOW = 5.6 l/s