

- GENERAL DESIGN TO BE IN ACCORDANCE WITH 'WATER SENSITIVE URBAN DESIGN TECHNICAL GUIDELINES' (WATER BY DESIGN).
- GUIDELINES: SWALES, BIORETENTION SYSTEMS AND WETLANDS' (WATER BY DESIGN) CONSTRUCTION TO BE IN ACCORDANCE WITH 'CONSTRUCTION AND ESTABLISHMENT
- PLANS. INVERT LEVELS AND BASE LEVELS MUST BE NOTED ON PROJECT DRAWINGS (WATER BY DESIGN). CONSTRUCTION TOLERANCES MUST BE NOTED ON PROJECT ESTABLISHMENT GUIDELINES: SWALES, BIORETENTION SYSTEMS AND WETLANDS' **CONSTRUCTION TOLERANCES** AS DOCUMENTED IN CONSTRUCTION AND
- FILTER CLOTH PROPRIETARY PRODUCT, BIDUM A24 OR EQUIVALENT, NON-WOVEN (WATER BY DESIGN). ACCORDANCE WITH 'WATER SENSITIVE URBAN DESIGN TECHNICAL GUIDELINES' IMPERVIOUS LINER MAY BE REQUIRED SUBJECT TO SOIL TESTING REQUIREMENTS IN GEOTEXTILE. FILTER CLOTH NOT TO BE PLACED BETWEEN ANY FILTER LAYERS.
- **BIORETENTION MEDIA SPECIFICATION SHALL BE IN ACCORDANCE WITH THE** ADOPTION GUIDELINES FOR STORMWATER BIOFILTRATION SYSTEMS' (FAWB)
- SENSITIVE URBAN DESIGN TECHNICAL GUIDELINES' (WATER BY DESIGN) NUMBER OF SAMPLES TO BE TESTED SHALL BE IN ACCORDANCE WITH THE 'WATER BIORETENTION HYDRAULIC CONDUCTIVITY SHALL BE IN ACCORDANCE WITH THE 'ADOPTION GUIDELINES FOR STORMWATER BIOFILTRATION SYSTEMS' (FAWB). THE
- SLOTTED PIPE. UNDER-DRAIN CLEAN-OUT IN ACCORDANCE WITH 'WATER SENSITIVE 1500MM CENTRES. 50mm DRAINAGE LAYER (FINE AGGREGATE) COVER OVER UNDER-DRAINAGE PIPES SHALL BE SEALED INTO PITS USING GROUTS OR OTHER SOCK SURROUNDING PIPE. PIPE JOINS SHOULD BE GLUED WITH PLUMBING CEMENT. INVERT LEVEL (TYPICALLY Ø100-150). PIPE SHOULD NOT BE INSTALLED WITH A FILTER EQUIVALENT, 0.5% MIN. GRADE. REFER PROJECT DRAWINGS FOR DIAMETER AND <u>UNDER-DRAINS</u>: SLOTTED RIGID PIPE (UPVC OR SIMILAR TO AS 2439.1) OR APPROVED *URBAN DESIGN TECHNICAL GUIDELINES'* (WATER BY DESIGN) APPROVED WATERTIGHT SEAL. PIPES TO BE INSTALLED AT NO GREATER THAN
- **REQUIREMENTS** REFER TO PROJECT DRAWINGS. VEGETATED BATTER SLOPES (1 IN 2 MAX, 1 IN 4 TYPICAL) AND BATTER TOPSOII
- SENSITIVE URBAN DESIGN TECHNICAL GUIDELINES' (WATER BY DESIGN) PLANT SPECIFICATION AND DENSITY SHALL BE IN ACCORDANCE WITH 'WATER VEGETATION: PLANT LAYOUT TO BE AS SPECIFIED ON A PROJECT TO PROJECT BASIS
- BASIN FINISHED SURFACE LEVEL IS TOP OF FILTER MEDIA. SURFACE TO BE MULCHED
- **SERVICES: LOCATION OF SERVICES TO BE VERIFIED PRIOR TO EXCAVATION** FROM ANY WATER SUPPLY AND SEWERAGE INFRASTRUCTURE BIORETENTION SYSTEMS MUST HAVE A MINIMUM HORIZONTAL SETBACK OF 300mm
- ALL DIMENSIONS IN MILLIMETRES UNLESS SPECIFIED OTHERWISE



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COMMENTS FIRST ISSUE

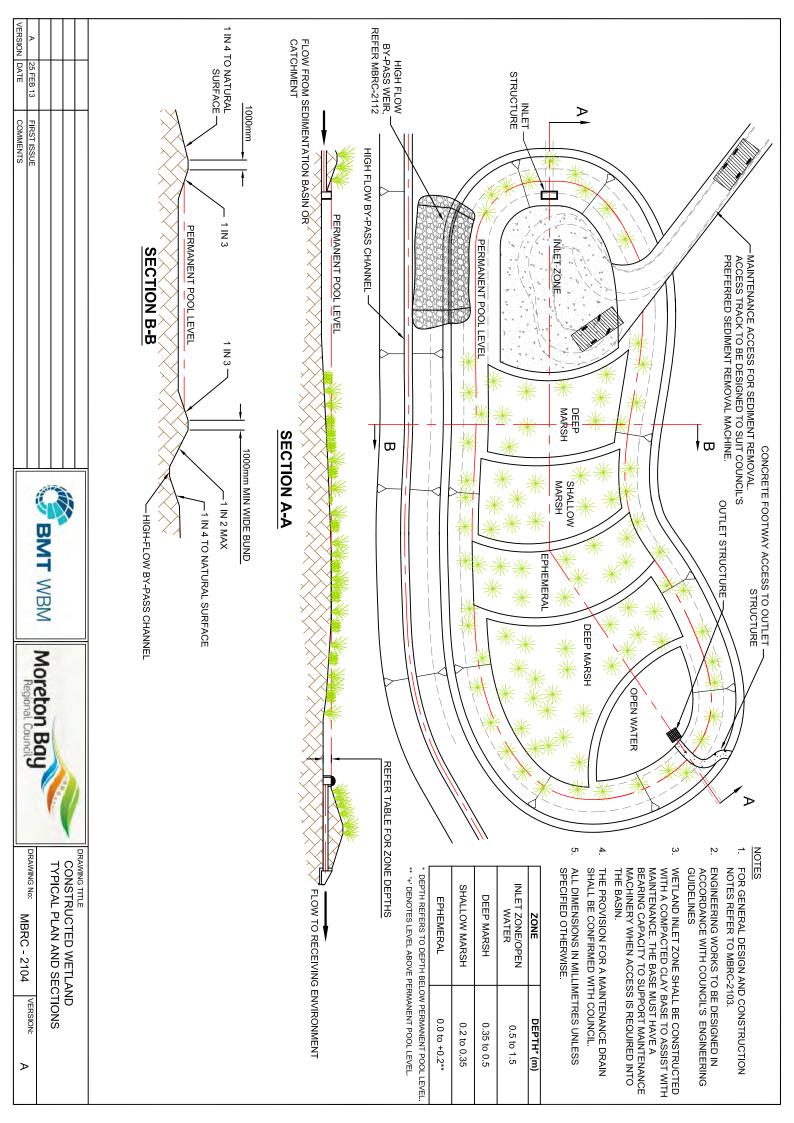
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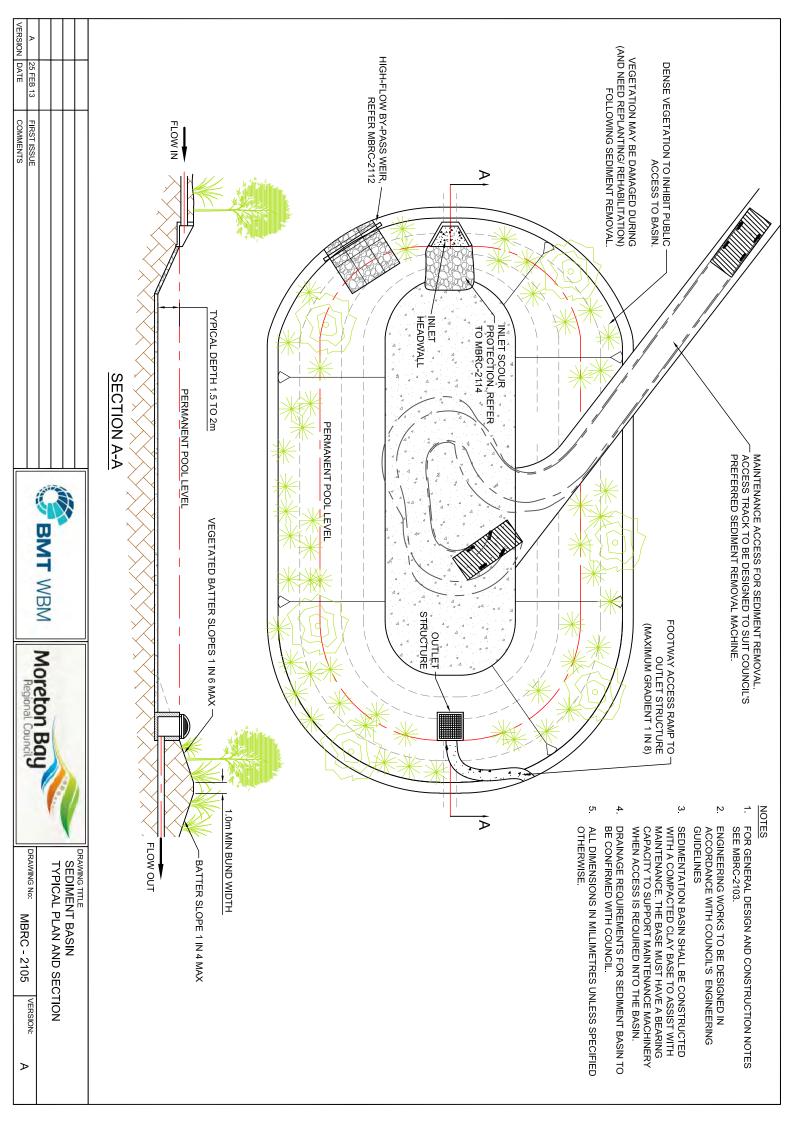
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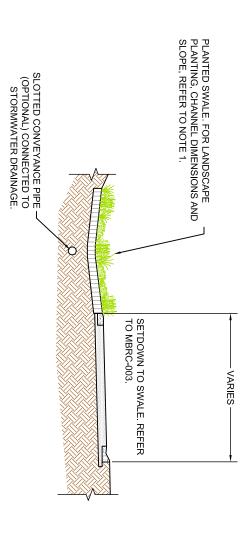
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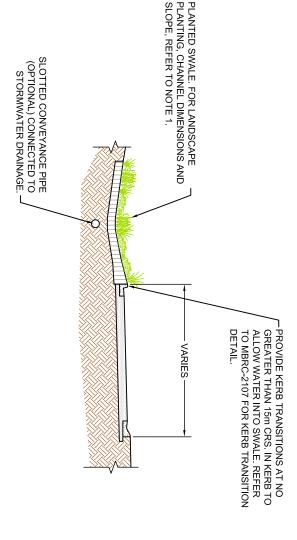
MBRC - 2103 VERSION:







TYPE 1 SWALE



ALTERNATIVE TYPE 1 SWALE

NOTES

- CHANNEL DIMENSIONS: SWALE BATTER SLOPES SHALL NOT BE STEEPER THAN 1V:4H BATTER OR KERB EDGE) OF 400mm. SWALE CAN BE TRAPEZOIDAL (IE. WITH A BASE SWALE IS TO HAVE A MAXIMUM INVERT DEPTH (DEPTH FROM INVERT TO TOP OF WIDTH) OR 'V-SHAPED'
- SWALE LONGITUDINAL GRADIENT: SWALE GRADIENT MUST NOT EXCEED 5% OR BE BELOW 1% ALONG ANY 10m SECTION OF THE SWALE. FOR SECTIONS WITH GRADIENTS LESS THAN 1%, A BIORETENTION SWALE (REFER TO MBRC-007) IS RECOMMENDED.
- MAXIMUM FLOW/DEPTH: VELOCITY DEPTH PRODUCT FOR Q2 EVENT MUST BE LESS ROAD CAPACITY LESS THAN 300mm. CONSIDERATION MUST BE GIVEN TO MAJOR (EG. Q100) FLOWS AND THAN $0.4 m^2 ls$ (WHICH WILL TYPICALLY NECESSITATE THE USE OF FIELD INLETS WITHIN THE SWALE AND CONVEYANCE PIPES). MAXIMUM PIPE OF FLOW IN Q2 EVENT MUST BE
- FIELD INLETS: FIELD INLETS TO BE LOCATED WITHIN SWALE CHANNEL UPSTREAM OF ROAD CROSSINGS AND/OR TO CONVEY FLOWS ABOVE SWALE CAPACITY TO PIPED REQUIREMENTS, BUT NOT TO EXCEED 60m. LANDSCAPING (EG. DENSE PLANTING OF INLETS BY PUBLIC. SHRUBS) SHOULD BE PROVIDED AROUND FIELD INLETS TO REDUCE ACCESS TO FIELD DRAINAGE. MAXIMUM FIELD INLET SPACINGS TO BE DETERMINED BASED ON NOTE $3\,$
- ADJACENT LAND USAGE: FOR 'TYPE 1' SWALES, LAND USAGE IMMEDIATELY ADJACENT TO SWALE SHALL BE OPEN SPACE (EG. FOREST, PARK)
- BE USED WITHIN THE TREES AND POLES ALIGNMENT IN ACCORDANCE WITH THE DISCOURAGE THE DRIVING OR PARKING OF VEHICLES IN THE SWALE. BOLLARDS MAY TRAFFIC CONTROLS: DESIGNERS SHALL INCORPORATE FEATURES THAT PREVENT OR
- MINIMUM HEIGHT TO BE 1000mm
- **BOLLARDS TO BE MADE FROM SUSTAINABLE PRODUCTS**
- PREFERABLE MAXIMUM IN CROSS SECTION TO BE 150 X 150
- NO CONCRETE FOOTINGS
- CONSIDER VISIBILITY WHEN SPECIFYING COLOUR
- NOT RECOMMENDED FOR GREATER THAN 50km/hr ENVIRONMENTS
- REFLECTORS SHOULD BE FITTED
- KERBS: KERBS TO BE CONSTRUCTED IN ACCORDANCE WITH MBRC STANDARD
- FOR CONCRETE EDGE DETAILS, REFER TO MBRC STANDARD DRAWINGS
- FOR ROAD WIDTHS, REFER TO MBRC STANDARD DRAWINGS
- 5 DRAWING DETAIL BASED ON THE BRISBANE CITY COUNCIL DRAWING UMS 159-1, JUNE
- ALL DIMENSIONS IN MILLIMETRES UNLESS SPECIFIED OTHERWISE



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DATE 25 FEB 13

COMMENTS

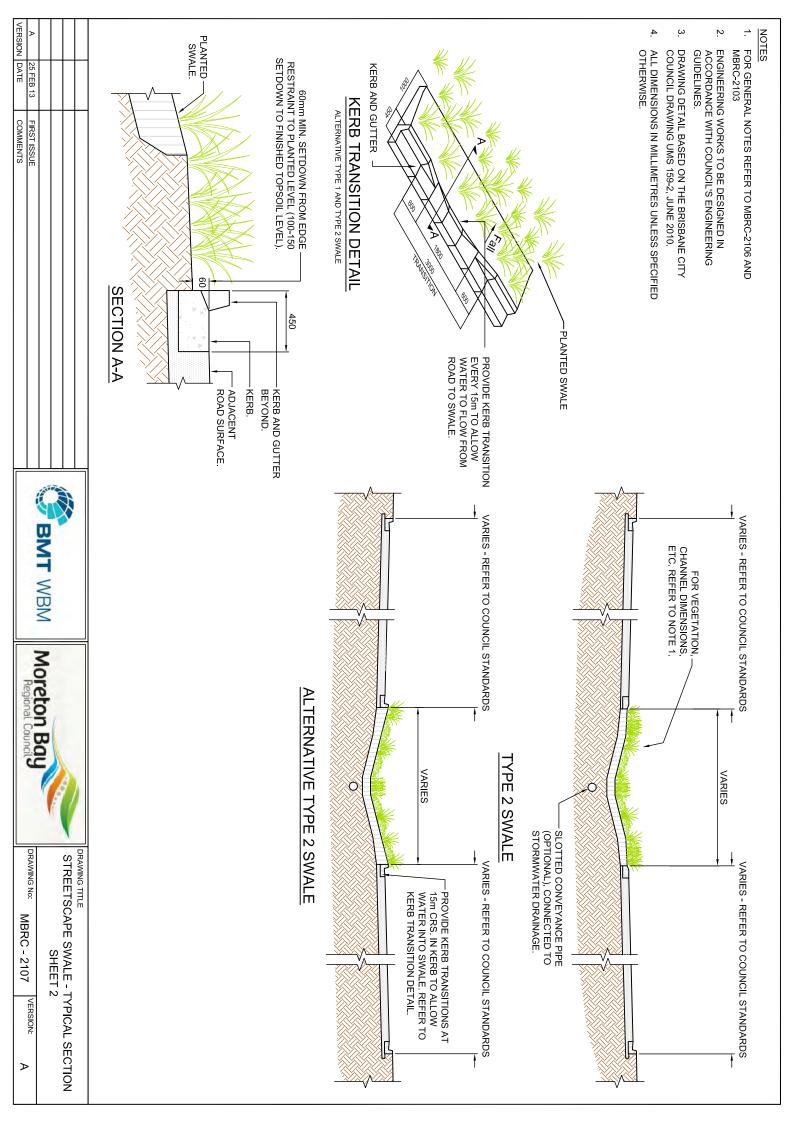
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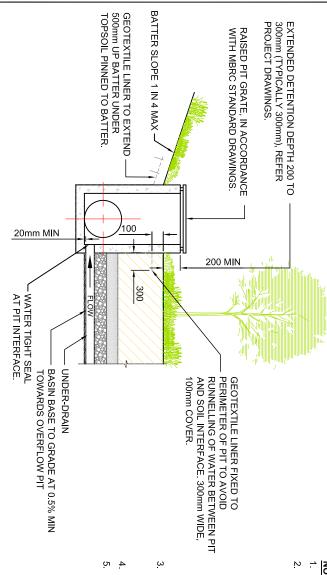
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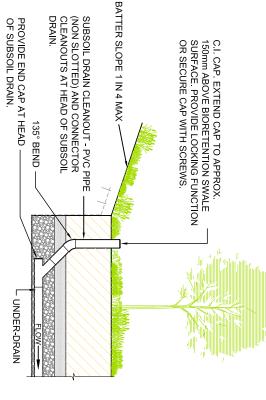
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BIORETENTION OVERFLOW PIT - TYPICAL SECTION



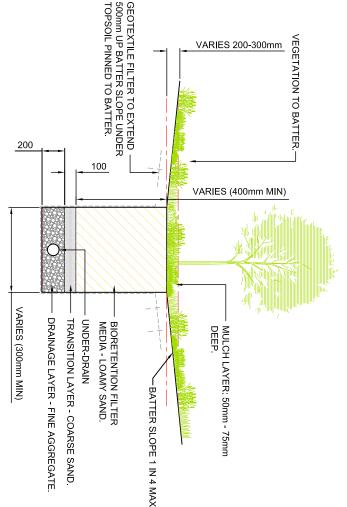
BIORETENTION UNDER-DRAIN CLEANOUT - TYPICAL SECTION

ERSION

DATE 25 FEB 13

FIRST ISSUE COMMENTS

- FOR GENERAL DESIGN AND CONSTRUCTION NOTES REFER TO MBRC-2103
- TRAFFIC CONTROLS: FOR STREETSCAPE SYSTEMS, DESIGNERS SHALL INCORPORATE FEATURES THAT PREVENT OR DISCOURAGE THE DRIVING OR PARKING OF VEHICLES IN THE BIORETENTION SYSTEM. BOLLARDS MAY BE USED WITHIN THE TREES AND POLES ALIGNMENT IN ACCORDANCE WITH THE FOLLOWING
- MINIMUM HEIGHT TO BE 1000mm
- CONSIDER VISIBILITY WHEN SPECIFYING COLOUR
- **BOLLARDS TO BE MADE FROM SUSTAINABLE PRODUCTS**
- NOT RECOMMENDED FOR GREATER THAN 50km/hr ENVIRONMENTS
- PREFERABLE MAXIMUM IN CROSS SECTION TO BE 150x150
- NO CONCRETE FOOTINGS
- SERVICES: LOCATION OF SERVICES TO BE VERIFIED PRIOR TO EXCAVATION. BIORETENTION SYSTEMS MUST HAVE A MINIMUM HORIZONTAL SETBACK OF 300mm FROM ANY WATER SUPPLY AND SEWERAGE
- DRAWING DETAIL BASED ON THE BRISBANE CITY COUNCIL DRAWING UMS-160, JUNE 2010.
- ALL DIMENSIONS IN MILLIMETRES UNLESS SPECIFIED OTHERWISE

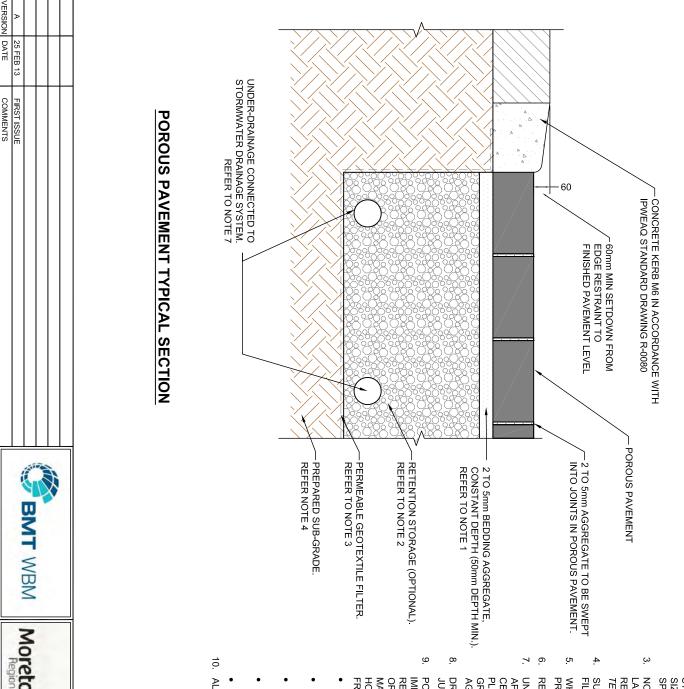


BIORETENTION SWALE - TYPICAL SECTION



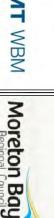
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MBRC - 2108	BIORETENTION SWALE - TYPICAL SECTIONS
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NOTES

- BEDDING AGGREGATE MATERIAL SHALL MEET MATERIAL AND GRADING COMPATIBILITY CRITERIA IN TECHNICAL SPECIFICATION FOR THE WORKS AND/ OR THE PAVEMENT MANUFACTURER'S TECHNICAL SPECIFICATIONS.
- SPECIFIED IN THE PAVEMENT MANUFACTURE'S TECHNICAL SPECIFICATION SIZE) AND FREE FROM SILT/CLAY FINES OR OTHER DELETERIOUS MATTER, OR AS STONE OR ROCK OF GENERALLY UNIFORM PARTICLE SIZE (TYPICALLY 10 TO 63 mm THE RETENTION STORAGE MEDIA SHALL COMPRISE COARSE, SOUND, CLEAN
- NON-WOVEN GEOTEXTILE FILTER MEDIA NOT TO BE PLACED BETWEEN ANY FILTER REQUIREMENTS IN ACCORDANCE WITH THE 'WATER SENSITIVE URBAN DESIGN LAYERS. IMPERVIOUS LINER MAY BE REQUIRED SUBJECT TO SOIL TESTING TECHNICAL GUIDELINES' (WATER BY DESIGN).
- SUB-GRADE TO BE RIPPED/ HARROWED PRIOR TO PLACEMENT OF GEOTEXTILE
- WHERE POSSIBLE, ANY RUNOFF DIRECTED TO POROUS PAVEMENTS SHALL BE PRE-TREATED TO REMOVE COARSE TO MEDIUM SEDIMENTS.
- REFER TO MANUFACTURE'S SPECIFICATION FOR MAXIMUM TRAFFIC LOADING
- UNDER-DRAINAGE SLOTTED PVC PIPE (uPVC OR SIMILAR TO AS2439.1) OR GROUT OR OTHER APPROVED WATERTIGHT SEAL. 50mm DRAINAGE LAYER (FINE PLUMBING CEMENT. UNDER-DRAINAGE PIPE SHALL BE SEALED INTO PITS USING CENTRES. DIAMETER TYPICALLY 100-500mm. PIPE JOINS SHOULD BE GLUED WITH APPROVED EQUIVALENT, 0.5% MINIMUM GRADE, INSTALLED AT 1500mm MAXIMUM AGGREGATE) COVER OVER SLOTTED PIPE.
- DRAWING DETAIL BASED ON THE BRISBANE CITY COUNCIL DRAWING UMS-161 **JUNE 2010**
- IMPERMEABLE PAVEMENT IN LOCATIONS SUCH AS COMMERCIAL CAR PARK BAYS. POROUS PAVEMENT CAN PROVIDE AN ALTERNATIVE TO CONVENTIONAL FROM GOLD COAST CITY COUNCIL 2007, COOMBES 2003) HOWEVER, ARE NOT SUITABLE FOR PERMEABLE PAVING SYSTEMS (ADAPTED OR LOADING ZONES, FOOTPATHS, CYCLEWAYS, PARKING PADS (E.G. MAINTENANCE ACCESS) AND TREE PIT SURROUNDS. THE FOLLOWING AREAS RESIDENTIAL OR LIGHT COMMERCIAL DRIVEWAYS, INDUSTRIAL STORAGE AREAS
- WHERE A WATER TABLE IS LOCATED WITHIN 2M OF THE PROPOSED PAVEMENT
- AREAS WITH HIGH TRAFFIC VOLUMES OR WITH REGULAR HEAVY VEHICLE
- LESS THAN 0.36mm/hr LOCATIONS WITH CLAY SOILS OR SOILS WITH A HYDRAULIC CONDUCTIVITY OF
- PAVEMENT SURFACE AREAS WHERE IMPERMEABLE ROCK IS LOCATED WITHIN 2m OF THE PROPOSED
- LOCATIONS SUBJECT TO RUN-OFF WITH A HIGH SEDIMENT LOAD
- 10. ALL DIMENSIONS IN MILLIMETRES UNLESS SPECIFIED OTHERWISE



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COMMENTS

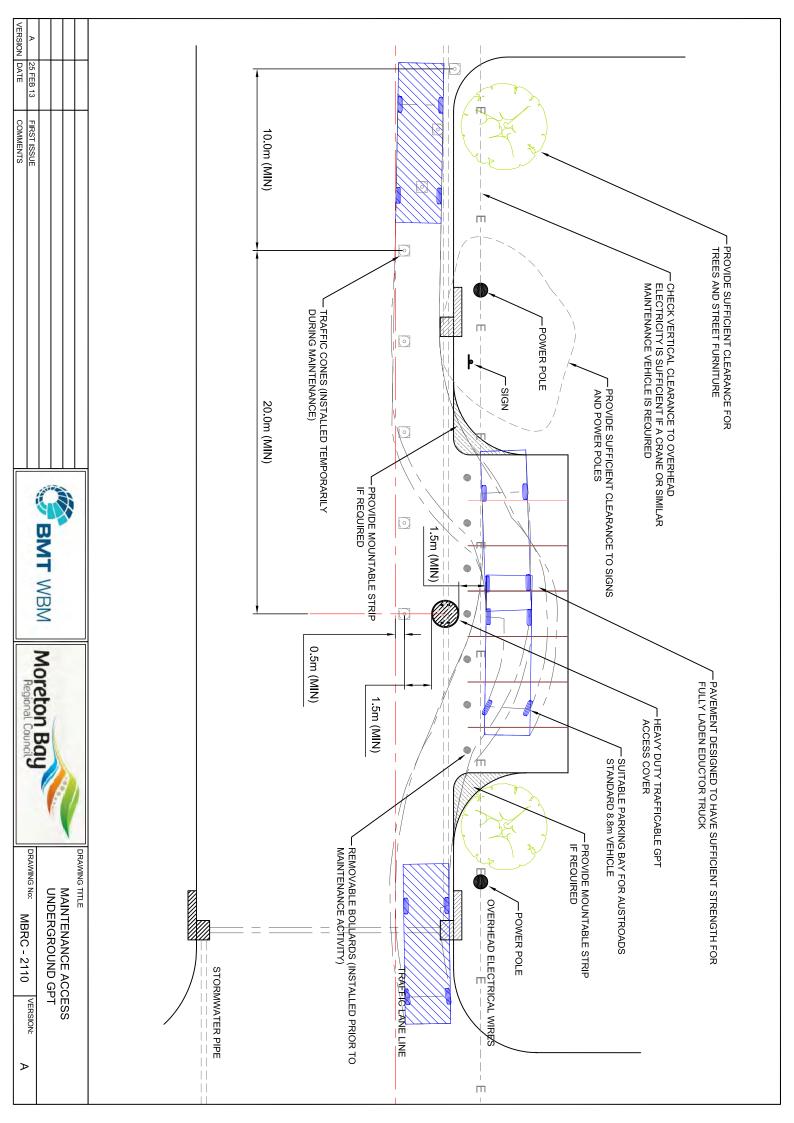


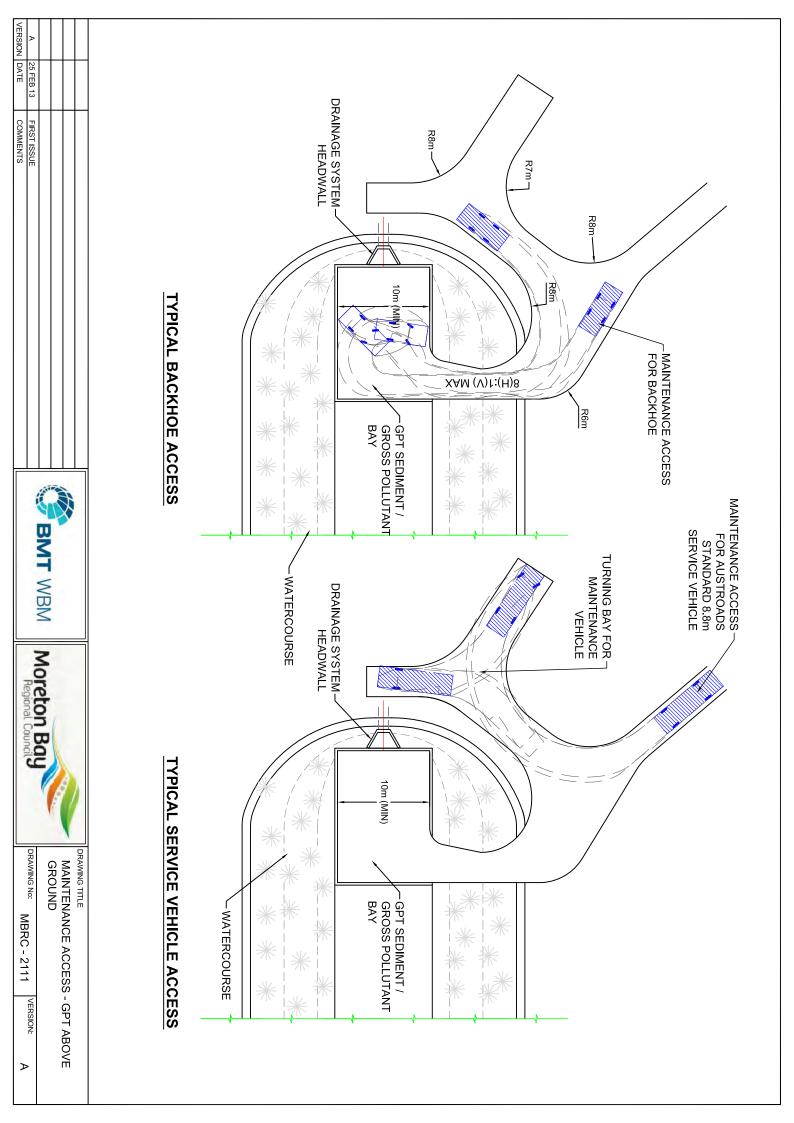
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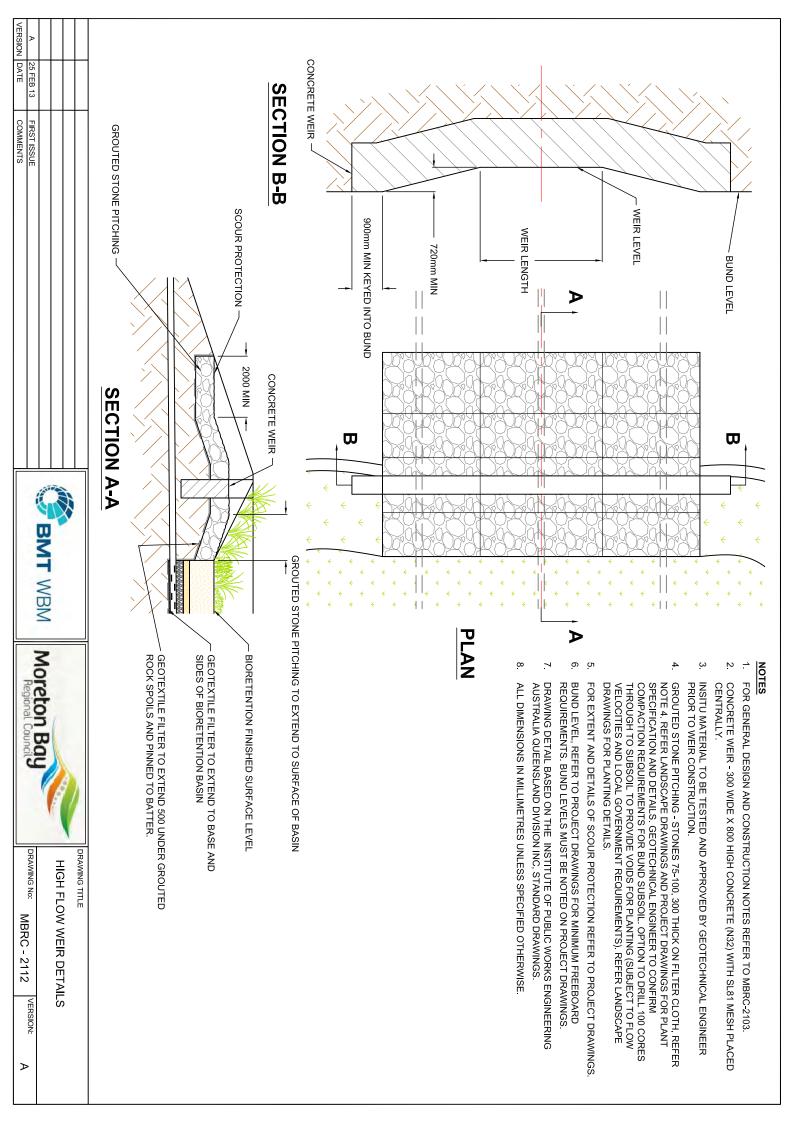
POROUS PAVEMENT - TYPICAL SECTION

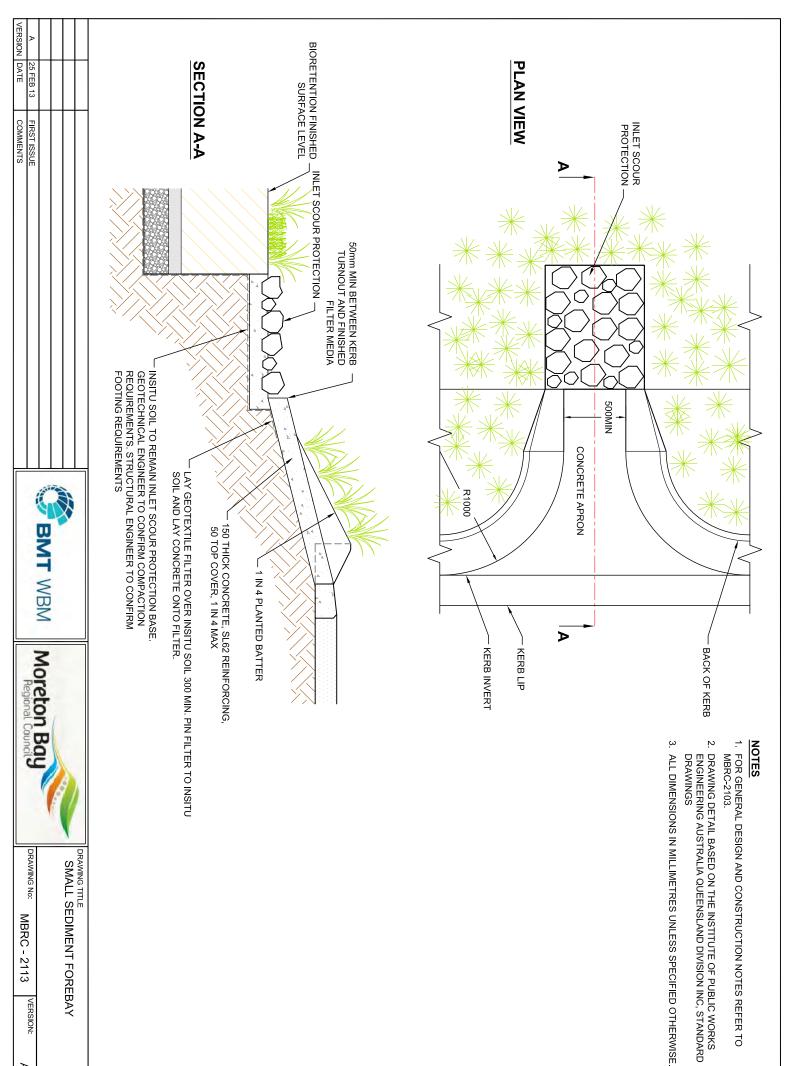
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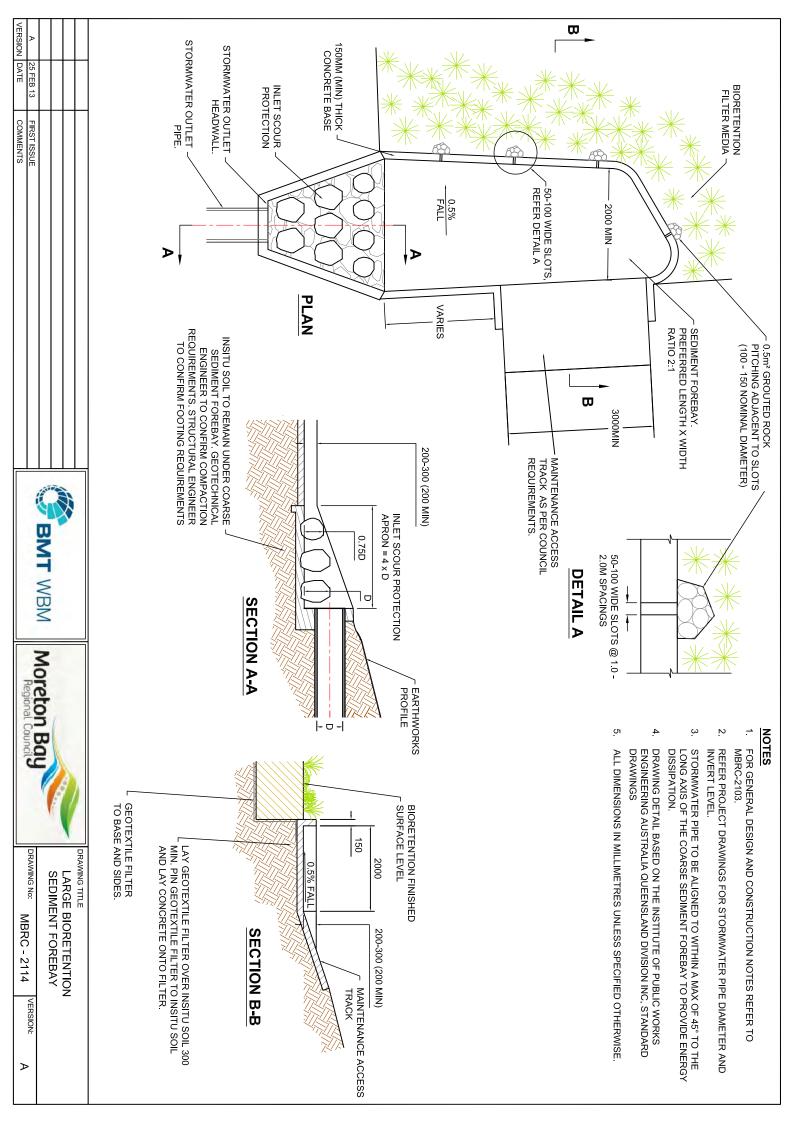


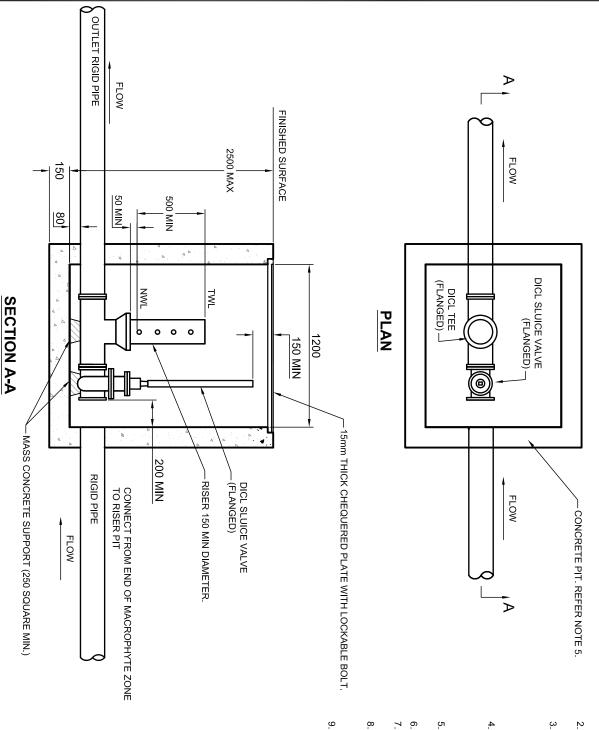






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25 FEB 13 DATE

FIRST ISSUE COMMENTS

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Moreton Bay

DRAWING No:

MBRC - 2115

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DRAWING TITLE

WETLAND LOW FLOW RISER OUTLET

NOTES

- FOR GENERAL DESIGN AND CONSTRUCTION NOTES REFER TO MBRC-2103.
- REFER TO PROJECT DRAWINGS FOR RIGID PIPE DIAMETER AND INVERT LEVEL.
- DICL SLUICE VALVE, REFER PROJECT DRAWINGS FOR VALVE SIZE. VALVE TO REMAIN IN CLOSED POSITION FOR NORMAL OPERATION. VALVE TO BE OPENED TO LOWER THE WATER LEVEL FOR MAINTENANCE OF THE WETLAND, BIORETENTION SYSTEM OR SEDIMENTATION BASIN.
- RISER RIGID PIPE CL16, REFER TO PROJECT DRAWINGS FOR HOLES SIZES AND LOCATIONS. HOLE SIZE AND NUMBER AS PER RELEVANT SECTION OF "WATER SENSITIVE URBAN DESIGN TECHNICAL DESIGN GUIDELINES" (WATER BY DESIGN).
- FOR PITS OVER 2500MM IN DEPTH, REFER PROJECT DRAWINGS FOR PIT DIMENSIONS AND REINFORCING DETAILS.
 CONCRETE N25 IN ACCORDANCE WITH AS 1379 AND AS 3600.
- LID AND FRAME TO BE HOT DIP GALVANISED AFTER FABRICATION TO AS 1650
- DRAWING DETAIL BASED ON THE INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALIA QUEENSLAND DIVISION INC, STANDARD DRAWINGS.
- ALL DIMENSIONS IN MILLIMETRES UNLESS SPECIFIED OTHERWISE