DRAINAGE MOUND CONSTRUCTION METHOD

REFERENCE:

BRE478 MOUND FILTER SYSTEMS FOR THE TREATMENT OF DOMESTIC WASTEWATER.
RICHARD PHELPS AND JOHN GRIGGS.
ISBN 1 86081 747 5

GOOD CONSTRUCTION TECHNIQUES ARE ESSENTIAL IF A MOUND IS TO FUNCTION PROPERLY AND PROVIDE MANY YEARS OF TROUBLE-FREE OPERATION.

SITE LAYOUT

1. USING APPROPRIATE SURVEYING EQUIPMENT, STAKE OUT THE MOUND'S PERIMETER AND DISTRIBUTION LAYER IN THE CORRECT ORIENTATION USING THE DIMENSIONS SPECIFIED IN THE CONTRACT DRAWINGS. REFERENCE STAKES SET 3-6m FROM THE MOUND PERIMETER SHOULD ALSO BE USED IN THE EVENT THE CORNER STAKES ARE REMOVED DURING CONSTRUCTION. LAYOUT AND STAKE THE LOCATIONS OF THE FOUL AND TREATED EFFLUENT WATER DRAIN/RISING MAIN TRENCH, SEWAGE TREATMENT PLANT, AND CHAMBERS.

2. THE AREA REQUIRED FOR THE MOUND, AND AN ADDITIONAL 15m DOWNSLOPE FROM THE SITE, SHOULD BE FENCED OFF. THIS WILL PREVENT DISTURBANCE, SCALPING, OR COMPACTION OF THE MOUND SITE BY CONSTRUCTION EQUIPMENT. ALL VEHICULAR TRAFFIC SHOULD BE PROHIBITED FROM THIS AREA BEFORE, DURING, AND AFTER THE CONSTRUCTION OF THE BUILDING AND INSTALLATION OF THE FOUL DRAINAGE SYSTEM.

SITE PREPARATION

3. MOW AND REMOVE ANY EXCESSIVE VEGETATION OVER THE DESIGN AREA OF THE MOUND. ANY TREES SHOWN ON THE CONTRACT DRAWINGS TO BE REMOVED, SHOULD BE CUT AT GROUND LEVEL AND THE STUMPS LEFT IN PLACE.

4. BEFORE THE SURFACE SOIL IS TILLED, THE FOLLOWING DETERMINATIONS MUST BE MADE. REFERRING TO A POINT OF KNOWN ELEVATION ESTABLISHED IN THE PREVIOUS TOPOGRAPHICAL SURVEY OF THE SITE, DETERMINE THE HIGHEST ELEVATION OF THE PLOUGHED SOIL SURFACE WITHIN THE PERIMETER OF THE MOUND'S LOCATION. THEN, CALCULATE THE BASE LEVEL OF THE DISTRIBUTION LAYER BY ADDING THE DEPTH OF THE FILTER MATERIAL BENEATH THE DISTRIBUTION LAYER TO THE ELEVATION MEASUREMENT ABOVE. THE BASE LEVEL OF THE DISTRIBUTION LAYER WILL BE USED IN A LATER STEP OF THE CONSTRUCTION PROCEDURE.

5. INSTALL THE TREATED EFFLUENT RISING MAIN FROM THE PACKAGE SEWAGE TREATMENT PLANT TO THE DISTRIBUTION AND SAMPLING CHAMBER ON THE UPSLOPE EDGE OF THE MOUND'S DISTRIBUTION LAYER. EXCAVATE A TRENCH, SO THE PIPE WILL LIE EITHER BELOW THE FROST LINE OR SLOPE BACK TO THE DOSING CHAMBER SO IT WILL DRAIN AFTER EACH DOSE. BACKFILL AND COMPACT THE SOIL AROUND THE PIPE TO MINIMISE DISTORTION/SAGGING ALONG THE PIPE. THIS STEP SHOULD BE DONE BEFORE PLOUGHING TO AVOID COMPACTION OF THE SOIL SURFACE DUE TO THE PIPE LAYING OPERATION.

6. CORRECT SURFACE PREPARATION IS VERY IMPORTANT IN MOUND CONSTRUCTION. SEEPAGE MAY OCCUR BETWEEN THE MOUND AND THE SOIL SURFACE IF SURFACE PREPARATION IS POORLY DONE OR IF THE SOIL IS TOO WET DURING THE TILLAGE OPERATION. THE SOIL IS CONSIDERED TOO WET TO PLOUGH IF A SOIL SAMPLE TAKEN FROM THE PLOUGH DEPTH FORMS A RIBBON (E.G. 4mm DIAMETER) WHEN ROLLED BETWEEN THE PALMS. IF IT CRUMBLES, PLOUGHING MAY PROCEED. THIS PRELIMINARY INVESTIGATION IS ESSENTIAL TO PREVENT POSSIBLE SYSTEM FAILURE. PLOUGH THE AREA WITHIN THE MOUND PERIMETER 775 - 800mm DEEP, AND PARALLEL TO THE CONTOUR OF THE SLOPE, USING A MOULDBOARD OR CHISEL PLOUGH. (DO-NOT-USE A SINGLE-BOTTOM MOULDBOARD PLOUGHS BECAUSE THE TRACE WHEEL WILL COMPACT THE SOIL AT THE BOTTOM OF EACH FURROW). EACH FURROW SLICE SHOULD BE THROWN UPSLOPE. IF A CHISEL PLOUGH IS USED, MAKE TWO PASSES. ON SITES THAT CANNOT BE PLOUGHED (E.G. WOODED AREAS WITH STUMPS) ROUGHEN THE SURFACE TO A DEPTH OF 775 - 800mm WITH THE EXCAVATOR BACKHOE TEETH. 'ROTOVATING' UNPLOUGHED AREAS IS NOT USUALLY RECOMMENDED BECAUSE OF POTENTIAL DAMAGE TO THE SOIL STRUCTURE, BUT MAY BE USED IN GRANULAR SOILS SUCH AS SANDS. GRANULAR FILL MATERIAL MAY BE USED INSTEAD OF NATIVE SOIL FOR BACKFILL.

7. IF MOUND CONSTRUCTION MUST BE TEMPORARILY STOPPED, COVER THE PLOUGHED AREA WITH AT LEAST 200mm OF FILTER MATERIAL OR WITH A TEMPORARY REMOVABLE COVER TO PROTECT FROM RAINFALL. THIS PREVENTS COMPACTION AND SEALING. IF THE SITE IS LEFT UNCOVERED DURING RAINFALL ANOTHER PASS WITH THE PLOUGH WILL BE NECESSARY AFTER THE SOIL HAS DRIED OUT.

FILL PLACEMENT

8. AT THE UPSLOPE EDGE OF THE PROPOSED MOUND DISTRIBUTION LAYER, ENSURE THE TREATED EFFLUENT RISING MAIN PIPE EXTENDS ABOVE THE LEVEL OF THE INFILTRATION PIPEWORK TO THE INCOMING INVERT OF THE DISTRIBUTION AND SAMPLING CHAMBER.

9. LAY 'GEOTEXTILE TWO' ONTO THE TILLED SURFACE AS SPECIFIED AND SHOWN ON THE CONTRACT DRAWINGS, WITH A MINIMUM OVERLAP OF 200mm BETWEEN SHEETS.

10. ON THE UPSLOPE EDGES OF THE PLOUGHED AREA, USE MEDIUM SAND (AS DEFINED ON THE CONTRACT DRAWINGS) AS THE FILTER MATERIAL. THE USE OF MEDIUM SAND IS IMPORTANT; SUBSTITUTES MAY NOT BE ACCEPTABLE. THE SUITABILITY OF THE FILTER MATERIAL CAN BE ASCERTAINED BY THE METHOD DESCRIBED IN APPENDIX 11. KEEP ALL TRAFFIC OFF THE PLOUGHED AREA AND THE DOWNSLOPE SIDE OF THE PLANNED MOUND TO AVOID COMPACTION.

11. MOVE THE FILTER MATERIAL INTO PLACE USING A SMALL TRACK-TYPE TRACTOR WITH A BLADE. ALWAYS KEEP AT LEAST 150mm OF MATERIAL BENEATH THE TRACKS OF THE TRACTOR TO MINIMISE COMPACTION OF THE NATURAL SOIL. CONTINUE TO WORK THE FILTER MATERIAL IN THIS MANNER UNTIL THE HEIGHT OF THE FILTER MATERIAL IS THE SAME ELEVATION AS THE TOP OF THE DISTRIBUTION LAYER AND IS SHAPED ACCORDING TO THE DIMENSIONS SPECIFIED ON THE CONTRACT DRAWINGS.

12. SHAPE THE DISTRIBUTION LAYER WITHIN THE MOUND TO THE SPECIFIED DEPTH, EITHER BY HAND OR WITH THE BLADE OF THE TRACTOR. HAND LEVEL THE INVERT OF THE DISTRIBUTION LAYER, CHECKING THE BASE ELEVATION AGAINST THE REFERENCE ELEVATION CALCULATED IN OF THE PREVIOUS SECTION (*SITE PREPARATION NUMBER 4*) WITH A TRANSIT OR ENGINEER'S LEVEL. SHAPE THE EDGE SLOPES OF THE FILTER MATERIAL TO AT LEAST A THREE TO ONE SLOPE.

PRESSURE DISTRIBUTION NETWORK PLACEMENT

13. LAY 'GEOTEXTILE ONE' OVER THE FILTER MATERIAL, TO THE EXTENT OF THE DISTRIBUTION LAYER AS SPECIFIED AND SHOWN ON THE CONTRACT DRAWINGS, WITH A MINIMUM OVERLAP OF 200mm BETWEEN SHEETS.

14. CAREFULLY PLACE WASHED GRANULAR FILL MATERIAL AS SPECIFIED ON THE CONTRACT DRAWINGS, OVER THE BOTTOM OF THE BED TO A MINIMUM DEPTH OF 100mm. IF RUTS ARE FORMED IN THE BASE OF THE DISTRIBUTION LAYER, LOOSEN AND RE-LEVEL THE FILTER MATERIAL BEFORE COVERING WITH GRANULAR FILL MATERIAL. FINALLY, LEVEL THE GRANULAR FILL MATERIAL.

15. INSTALL THE DISTRIBUTION AND SAMPLING CHAMBER ALONG WITH ANY DISTRIBUTION PIPES FOR CONNECTION TO THE INFILTRATION PIPES. ALL DISTRIBUTION AND INFILTRATION PIPING AND FITTINGS SHOULD BE OF AN APPROPRIATE MATERIAL, EG UPVC. THE DISTRIBUTION AND SAMPLING CHAMBER SHOULD BE POSITIONED SO THAT WATER WILL DRAIN BETWEEN DOSES TO PREVENT PLUGGING OR FREEZING. THE WATER SHOULD DRAIN INTO THE INFILTRATION PIPES.

16. FIRST, LAY OUT THE PIPING NETWORK. CLEAN ALL JOINTS TO BE GLUED WITH A SOLVENT. APPLY GLUE TO BOTH MALE AND FEMALE SECTIONS OF A JOINT, AND THEN JOIN. TWIST SLIGHTLY TO CREATE A LEAK-PROOF CONNECTION. GLUE A CAP TO THE END OF THE LATERAL PIPE FURTHEST AWAY FROM THE MANIFOLD.

17. BEGINNING AT THE DISTRIBUTION AND SAMPLING CHAMBER END OF THE INFILTRATION PIPES, THE FIRST HOLE IN THE PIPE IS DRILLED AT HALF THE HOLE SPACING DISTANCE (150mm). FURTHER HOLES ARE THEN DRILLED AT THE SPECIFIED HOLE SPACING DISTANCE UNTIL THE END IS REACHED (300mm CENTRES). THESE HOLES SHOULD BE DRILLED IN A LINE ALONG THE INVERT AND THE CROWN, OF THE INFILTRATION PIPE. WHEN FINISHED, ALL HOLES SHOULD FACE THE SAME DIRECTION. ON THE TOP SIDE OF THE END CAP, OPPOSITE THE ROW OF DOSING HOLES, DRILL A 7 mm AIR RELEASE HOLE TO ENSURE THAT ALL WASTEWATER DRAINS FROM THE LATERAL PIPE AFTER EACH DOSE. REMOVE ALL BURRS AROUND THE DOSING HOLES BOTH INSIDE AND OUTSIDE THE PIPE, TAKING CARE NOT TO ENLARGE ANY HOLE BEYOND ITS DESIGN DIAMETER. BE SURE TO REMOVE ANY LOOSE CHIPS FROM THE INSIDE OF THE INFILTRATION PIPES TO PREVENT POSSIBLE CLOGGING OF THE DOSING HOLES. IF THE PARTS OF THE INFILTRATION SYSTEM HAVE BEEN CAREFULLY IDENTIFIED, THE DRILLING OF THE HOLES CAN BE DONE IN A WORKSHOP BEFORE DELIVERY TO THE SITE FOR ASSEMBLY.

18. ASSEMBLE THE PIPE NETWORK ON TOP OF THE GRANULAR FILL MATERIAL. MAKE SURE THE DOSING HOLES OF EACH INFILTRATION PIPE ARE FACING TO THE TOP AND BOTTOM BEFORE CONNECTING THE PIPES TO THE DISTRIBUTION PIPES. ALSO, MAKE SURE THE INFILTRATION PIPES ARE LEVEL OVER THE ENTIRE BED BY USING AN ENGINEER'S OR OTHER SUITABLE LEVEL.

COVERING

19. CAREFULLY COVER THE PIPEWORK WITH ADDITIONAL GRANULAR FILL MATERIAL TO 50mm ABOVE THE CROWN OF THE PIPES.

20. LAY 'GEOTEXTILE ONE' OVER THE GRANULAR FILL MATERIAL, AS SPECIFIED AND SHOWN ON THE CONTRACT DRAWINGS, WITH A MINIMUM OVERLAP OF 200mm BETWEEN SHEETS.

21. COVER THE GEOTEXTILE WITH AT LEAST 150 mm OF FINE TEXTURED SUBSOIL OF CLAY OR SILT LOAM. THE COVER OVER THE BED SHOULD BE FURTHER MOUNDED SO THAT THE SOIL DEPTH, AT THE LONGITUDINAL CENTRELINE OF THE BED, IS 300mm, TO PROMOTE DRAINAGE FROM THE TOP OF THE MOUND.

22. FINALLY, PLACE AT LEAST 150mm OF GOOD QUALITY TOPSOIL OVER THE ENTIRE MOUND SURFACE TO PROVIDE A GROWING MEDIUM FOR GRASS AND TO ENHANCE SURFACE DRAINAGE AWAY FROM THE MOUND. CROSS SECTIONS OF COMPLETED MOUNDS SHOWING THE VARIOUS COVERING LAYERS ARE SHOWN ON THE CONTRACT DRAWINGS.

23. SOW GRASS OR LAY TURFS OVER THE MOUND USING GRASSES ADAPTED TO THE AREA, AS SPECIFIED BY THE LANDSCAPE ARCHITECT. SHRUBS MAY BE PLANTED AROUND THE TOE OF THE MOUND. THOSE PLANTED ON THE DOWN SLOPE SIDE SHOULD BE SOMEWHAT MOISTURE TOLERANT SINCE THIS AREA MAY BE RATHER MOIST DURING EARLY SPRING AND LATE AUTUMN. PLANTINGS ON TOP OF THE MOUND, ON THE OTHER HAND, SHOULD BE DROUGHT TOLERANT SINCE THE UPPER PORTION OF THE MOUND CAN BECOME QUITE DRY DURING THE SUmmER.

NOTES

1. DO NOT SCALE FROM THIS DRAWING, REFER TO FIGURED DIMENSIONS ONLY. THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE.
2. ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
3. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECT AND ENGINEERING DETAILS, DRAWINGS AND SPECIFICATIONS.
4. ANY DISCREPANCIES SHOULD BE REPORTED TO THE ARCHITECT AND/OR ENGINEER IMMEDIATELY, SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO THE COMMENCEMENT OF WORK.

0 5 10 20 30 40 50 100

CONSTRUCTION

REV	AMENDMENTS	DATE	CAD	CHKD	APPD
C01	ISSUED FOR CONSTRUCTION	15.07.2020	AB	FN	DR

CLIENT
HAMPSHIRE COUNTY COUNCIL
PROPERTY, BUILDINGS AND REGULATORY SERVICES
ARCHITECTS PRACTICE

CONSULTANT
Hampshire County Council Engineering Consultancy
STUART JARVIS BSc DipTP FCIHT MRTPI: DIRECTOR OF ECONOMY, TRANSPORT & ENVIRONMENT

DESIGNER	AB
CAD	AB
CHECKED	FN / FN
APPROVED	DR / DR

SCHEME: VERNHAM DEAN SCHOOL REPLACEMENT STP
JOB No. RJ511127.03

DRAWING TITLE: GENERAL DETAILS SHEET 03
HCC CAD PLOT: 14/8/2020 19:40:06

SCALE @ A1	DATE	SHEET NUMBER	DRAWING NUMBER	REV
AS SHOWN	15.07.2020	3 OF 3	C08102-ECH-ZZ-XX-DR-C-7654	C01

HCC CAD FILE: K:\Eng\Roads\Schemes\RJ511127 Vernham Dean School\AutoCAD\General\C08102-ECH-ZZ-XX-DR-C-0000-DRAWINGS.dwg