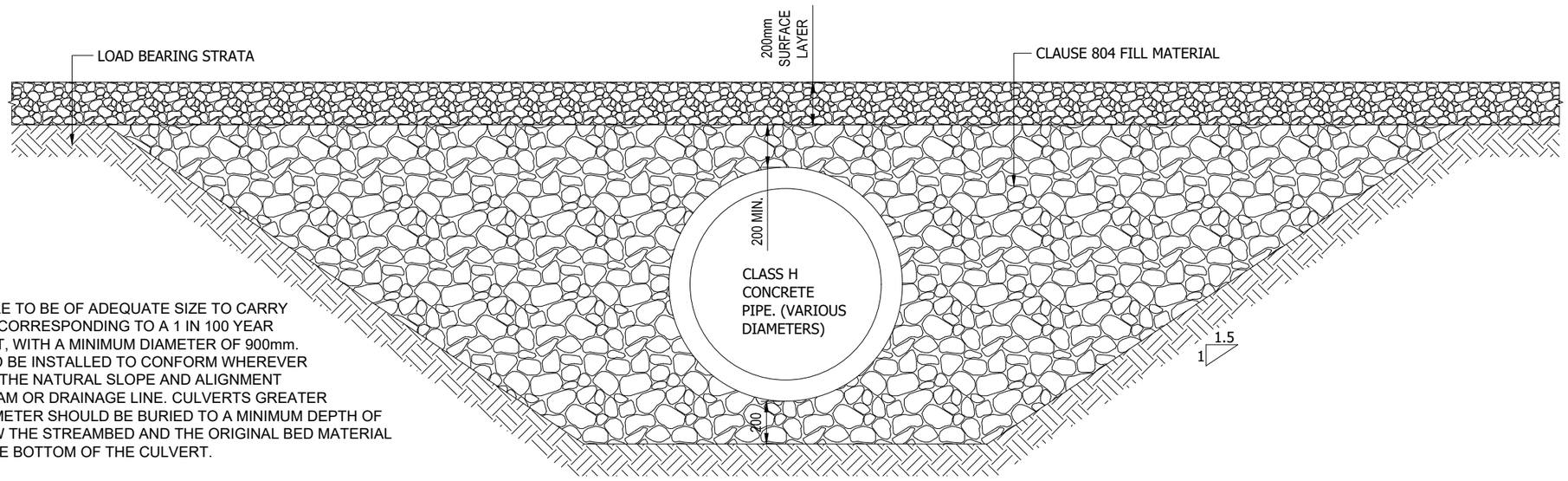


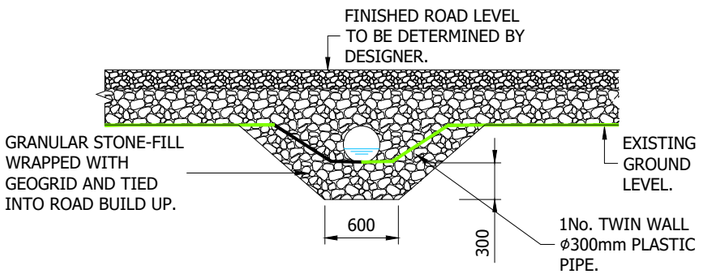
NOTE:
CULVERTS ARE TO BE OF ADEQUATE SIZE TO CARRY PEAK FLOWS CORRESPONDING TO A 1 IN 100 YEAR STORM EVENT, WITH A MINIMUM DIAMETER OF 900mm. THEY SHOULD BE INSTALLED TO CONFORM WHEREVER POSSIBLE TO THE NATURAL SLOPE AND ALIGNMENT OF THE STREAM OR DRAINAGE LINE. CULVERTS GREATER THAN 1m DIAMETER SHOULD BE BURIED TO A MINIMUM DEPTH OF 300mm BELOW THE STREAMBED AND THE ORIGINAL BED MATERIAL PLACED IN THE BOTTOM OF THE CULVERT.

TYPICAL SECTION THROUGH CULVERT

SCALE 1:25

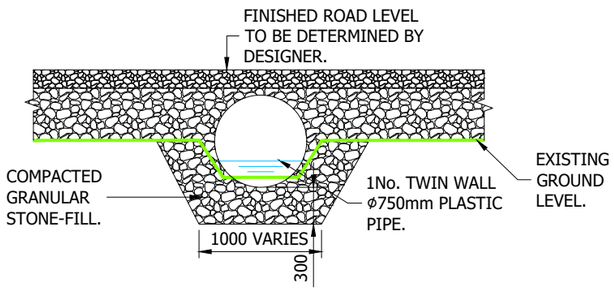
DRAINAGE NOTES

1. GENERAL:
   DRAINAGE BUFFER ZONE WIDTHS SHALL BE A MINIMUM OF 50m.
2. CONSTRUCTION AND MAINTENANCE
   - ROADSIDE DRAIN SHOULD NOT INTERCEPT LARGE VOLUMES OF WATER FROM THE GROUND ABOVE. ANY WATERCOURSE HOWEVER SMALL, THAT IS INTERRUPTED BY A ROAD SHOULD BE CULVERTED AT THAT POINT.
   - ROADSIDE DRAINS LIKELY TO CARRY HIGH SEDIMENT LOADS MUST NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO STREAMS, BUT MUST DISCHARGE INTO A BUFFER OF ADEQUATE WIDTH.
   - DRAINS ON THE UPPER SIDE OF THE ROAD MAY NEED CULVERTS TO THE LOWER SIDE, A SHORT DISTANCE BEFORE STREAM CROSSINGS SO AS TO PREVENT DIRECT DISCHARGE.
   - PROPER MAINTENANCE PROVISIONS MUST BE PUT IN PLACE SO AS TO ENSURE THE PROPER FUNCTIONING OF THE DRAINAGE SYSTEM INCLUDING REGULAR INSPECTIONS, CLEANING AND REPAIRS WHERE NECESSARY.
     REF: 'FORESTS & WATER GUIDELINES' 4TH ED. 2003 FORESTRY COMMISSION EDINBURGH, SCOTLAND.
     REF: 'FORESTS ROAD MANUAL' 1ST ED. 2004 - COFORD NATIONAL COUNCIL FOR FOREST RESEARCH AND DEVELOPMENT, DUBLIN, IRELAND.
3. DRAINS:
   - DRAINS SHALL BE DESIGNED AND CONSTRUCTED TO MITIGATE CHANNEL EROSION, E.G. BY INSTALLATION OF PERFORATED PIPE WITH STONE SURROUND, DRAINAGE DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SYSTEM OF STILLING PONDS AND BUFFERED OUTFALLS.
   - DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL BE CONVEYED THROUGH A BUFFERED OUTFALL WITHIN AN UNDISTURBED STABILISED AREA AT NON-EROSIVE VELOCITIES.
   - ALL OBSTRUCTIONS WITHIN A DRAINAGE CHANNEL SHALL BE REMOVED AND DISPOSED OF, SO AS NOT TO INTERFERE WITH THE PROPER FUNCTION OF THE DRAINAGE SYSTEM.
   - CHECK DAMS SHALL BE CONSTRUCTED USING WELL GRADED 150mm DOWN ANGULAR GRAVEL PLACED OVER A GEO-TEXTILE LAYER.
   - THE SPACING OF CHECK DAMS SHALL BE SUCH THAT THE PEAK OF THE DOWNSTREAM DAM IS NO LOWER THAN THE FOOT OF THE UPSTREAM DAM.
   - THE USE OF STRAW BALES WITHIN THE DRAINAGE SYSTEM SHOULD BE CONSIDERED ON A TEMPORARY BASIS DURING CONSTRUCTION AND MAINTENANCE WORK.
   - STRAW BALES SHOULD, HOWEVER, ONLY BE USED TO INTERCEPT SEDIMENT-LADEN RUNOFF FROM SMALL DRAINAGE AREAS OF DISTURBED SOIL.
   - BALES SHOULD BE ANCHORED IN PLACE BY THE USE OF TIMBER STAKES OR RE-BARS DRIVEN THROUGH THE BALE. WHERE BALES ARE TO BE PLACED IN POSITION ADJACENT TO OTHER BALES (EG WITHIN A STILLING POND), THE FIRST STAKE IN EACH BALE SHOULD BE DRIVEN TOWARDS THE PREVIOUSLY LAID BALE AT AN ANGLE. THIS HAS THE EFFECT OF FORCING THE TWO BALES TOGETHER.
   - BALES SHALL BE REPLACED AS REQUIRED AT A MAXIMUM OF THREE MONTHS FROM INSTALLATION.
   - BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS.
4. OUTFALLS:
   - ALL DRAINAGE CHANNELS SHALL FAN/TAPER OUT BEFORE ENTERING THE BUFFER ZONE. PRIOR TO ENTERING THE TAPERED ZONE, THE BASE OF THE DRAINAGE CHANNELS TO BE CONSTRUCTED OF A HARDCORE MATERIAL TO AID THE SETTLEMENT OF SUSPENDED SOLIDS.
   - NON-DEVELOPMENT RUN-OFF SHALL BE RETURNED TO SURFACE FLOW CONDITION E.G. BY USE OF LEVEL SPREADERS.
5. STILLING PONDS:
   - ANY SEDIMENT TRAPS/STILLING PONDS SHALL BE LOCATED OUTSIDE OF BUFFER ZONES AND HAVE NO DIRECT OUTFLOW INTO WATERCOURSES.
   - STILLING PONDS SHOULD BE SIZED TO ACCOMMODATE PEAK FLOWS CORRESPONDING TO A 1 IN 100 YEAR STORM EVENT FOR THEIR RESPECTIVE CATCHMENT AREAS.
   - MAINTENANCE WORKS INCLUDING THE REMOVAL OF SETTLED MATERIALS SHOULD ONLY BE CARRIED OUT IN DRY CONDITIONS I.E. BETWEEN JUNE AND SEPTEMBER. CARE SHOULD BE TAKEN WHEN REMOVING SETTLED MATERIALS SUCH THAT THE PONDS ARE NOT OVER DEEPENED.
   - IN THE DESIGN OF STILLING PONDS, CONSIDERATION SHOULD BE GIVEN TO IMPLEMENTING MEASURES SUCH THAT THERE IS NO POSSIBILITY TO DIRECT FLOW THROUGH THE POND E.G. OFFSET INLETS AND OUTLETS FROM THE CENTRE AXIS ETC.



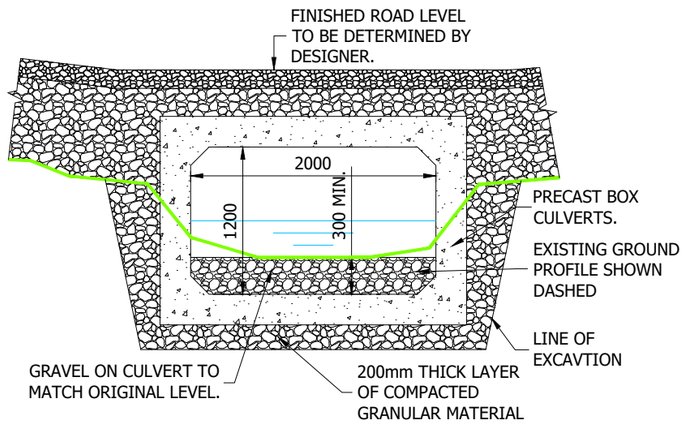
TYPE 1 CULVERT

SCALE 1:50



TYPE 2 CULVERT

SCALE 1:50



TYPE 3 CULVERT

SCALE 1:50

Please refer to the Surface Water Management Plan in Technical Appendix 2.3 for further details.

THIS DRAWING IS FOR PLANNING PURPOSES ONLY.
IT IS NOT TO BE USED AS A CONSTRUCTION DRAWING.

SCOTTISHPOWER RENEWABLES

ScottishPower Renewables
320 St Vincent Street
Glasgow
G2 5AD

Email: info@scottishpowerrenewables.com
Web: www.scottishpowerrenewables.com

Notes

Scale AS NOTED @ A3

Rev.	Date	By	Amendments

Project: **BARNESMORE WINDFARM REPOWERING**

Title: **INDICATIVE DRAINAGE DETAILS SHEET 4 OF 4**

FIGURE 2.7(d)

Issue Details				Office Use Only
Designed: JOD		Information		Drawing Number: 5952-300-304
Drawn: A.McC		Approval	X	
Checked: S.M		Tender		
Approved: DK		Construction		Date: 19/10/19
Scale: **As Noted**		Record		Rev.