



APPENDIX
4-1a

DRAINAGE DESIGN

POLLUTION PREVENTION NOTES:

- SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
 - SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
 - SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.
 - DISCHARGES**
 - WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
 - NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
 - PUMPED WATER WILL BE DIRECTED INTO COLLECTOR DRAINS AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
 - PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND/OR OTHER SIMILAR DISCHARGE CONTROLS.
 - VEGETATION (WHERE PRESENT) WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.
 - EXCAVATIONS**
 - WHERE DEEP EXCAVATIONS (>2.5M) ARE PROPOSED, CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.
 - EXPOSED GROUND & STOCKPILES**
 - DURING THE CONSTRUCTION PHASE, THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.
 - SITE TRACKS**
 - USE OF TRACK SIDE COLLECTOR DRAINS WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
 - WHERE USED, CHECK DAMS ARE TO BE INSPECTED AND CLEANED REGULARLY.
 - REFUELLING**
 - REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / MAIN DRAINS AND OUTSIDE OF WATERCOURSE BUFFERS.
 - SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.
 - CONCRETE**
 - CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
 - CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE. TEMPORARY CONCRETE WASH OUT AREA WILL BE PROVIDED WHERE DEEMED NECESSARY FOR LARGER POURS.
- IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:**
- STOP** - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.
- CONTAIN** - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. MAIN DRAINS AND OUTFALL ROUTES TO NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.
- NOTIFY** - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

- ACCESS TRACK SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SPARE SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, CHECK DAMS / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS, WHERE REQUIRED, MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE.
- SLODS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/ OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO MAIN DRAINS AND DRAINAGE ROUTES TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR DRAINS TO BE USED TO COLLECT AND REDISTRIBUTE UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
- WHERE REQUIRED, CROSS DRAINS ARE TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN LOW POINTS. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
- WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK DRAINS.
- BATTERS OF ALL PROPOSED DRAINS TO HAVE A SLOPE OF BETWEEN 1 : 1.5 TO 1 : 2 DEPENDING UPON DEPTH OF DRAIN AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE DRAINS TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT EROSION/SCOUR. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
- WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING DSOI.
- SILT FENCES OR SIMILAR, TO BE USED ALSO AROUND SUBSOIL SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING MAIN DRAINS / WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY MAIN DRAIN / EPHEMERAL CHANNELS.
- SLOPES OF THE DRAINS TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (PEAT 'SOO' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY FOR REUSE DURING LANDSCAPING OF STOCKPILES.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
- BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE DRAIN.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
- OILS/FUELS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.

MITIGATION / DRAINAGE COINTROLS AVAILABLE FOR USE ACROSS THE SITE

MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	<ol style="list-style-type: none"> APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE USING SMALL WORKING AREAS WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER
SOURCE CONTROLS	<ol style="list-style-type: none"> USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS, DIVERSION DRAINS, AND CULVERT PIPES EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL FILTER FABRICS AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS USING SMALL WORKING AREAS SURROUNDING TEMPORARY STOCKPILES CONTAINING SUBSOIL WITH SILT FENCING WEATHERING OFF / SEALING PEAT STOCKPILES
IN-LINE CONTROLS	<ol style="list-style-type: none"> INTERCEPTOR DRAINS, AND/OR COLLECTOR DRAINS/OTE DRAINAGE EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL SILT FENCES/FILTER FABRICS CHECK DAMS/WEIRS OR BAFFLES AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. IN STREAM SEDIMENTS COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS	<ol style="list-style-type: none"> SILT FENCING TEMPORARY SUMPS/ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. SILT DEWATERING BAGS
OUTFALL CONTROLS	<ol style="list-style-type: none"> LEVELSPREADERS BUFFERED OUTFALLS VEGETATION FILTERS SILT DEWATERING BAGS FLOW LIMITERS AND WEIRS

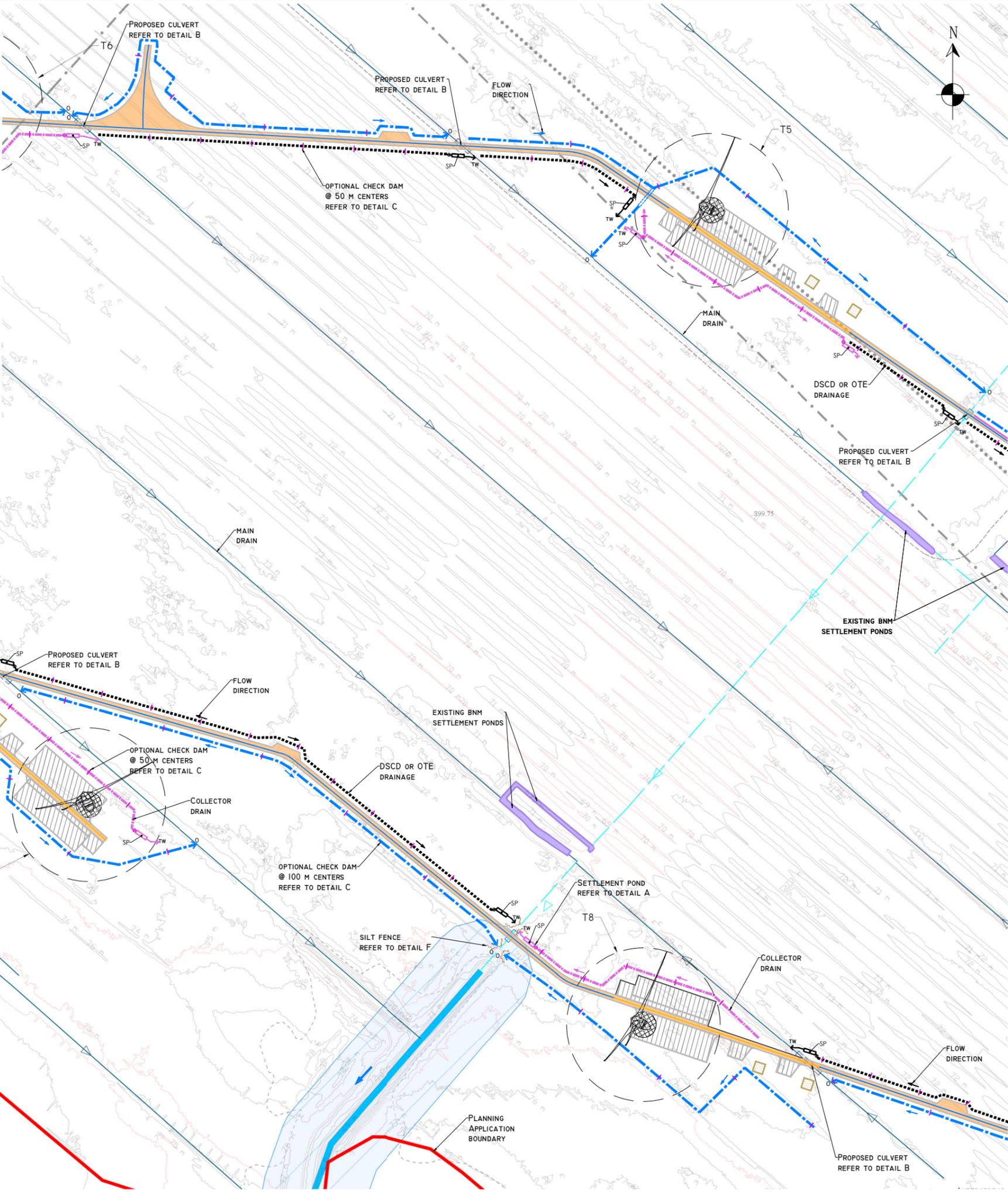
STOP - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

CONTAIN - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. MAIN DRAINS AND OUTFALL ROUTES TO NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.

NOTIFY - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

- ACCESS TRACK SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SPARE SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, CHECK DAMS / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS, WHERE REQUIRED, MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE.
- SLODS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/ OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO MAIN DRAINS AND DRAINAGE ROUTES TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR DRAINS TO BE USED TO COLLECT AND REDISTRIBUTE UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
- WHERE REQUIRED, CROSS DRAINS ARE TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN LOW POINTS. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
- WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK DRAINS.
- BATTERS OF ALL PROPOSED DRAINS TO HAVE A SLOPE OF BETWEEN 1 : 1.5 TO 1 : 2 DEPENDING UPON DEPTH OF DRAIN AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE DRAINS TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT EROSION/SCOUR. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
- WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING DSOI.
- SILT FENCES OR SIMILAR, TO BE USED ALSO AROUND SUBSOIL SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING MAIN DRAINS / WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY MAIN DRAIN / EPHEMERAL CHANNELS.
- SLOPES OF THE DRAINS TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (PEAT 'SOO' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY FOR REUSE DURING LANDSCAPING OF STOCKPILES.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
- BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE DRAIN.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
- OILS/FUELS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.



DRAWING LEGEND:

- RIVERS/STREAMS
- RIVERS/STREAMS 50M BUFFER
- STREAM FLOW DIRECTION
- DRAINING
- EXISTING MAIN DRAINS
- REDIRECTED MAIN DRAINS
- EXISTING PIPED DRAINS
- EXISTING BNM SETTLEMENT PONDS
- UPSTREAM INTERCEPTOR DRAIN
- DOWNSTREAM COLLECTOR DRAIN (DSCD)
- DSCD OR OTE (OTE)
- INDICATIVE DIRECTION OF FLOW
- SILT FENCES
- WF SETTLEMENT POND
- LEVEL SPREADER
- OPTIONAL CHECK DAM TYPE 'A'
- CHECK DAM TYPE 'B'
- PROPOSED CULVERTS/BRIDGES
- INTERCEPTOR DRAIN CULVERT
- COLLECTOR DRAIN CULVERT
- OVERLAND FLOW DISCHARGE
- TREATED WATER DISCHARGE
- WF SETTLEMENT POND

KEY PLAN

DRAWING NOTES:

- DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
- COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
- DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
- ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044723
© Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed

Revisions

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
Dungarvan
Co. Waterford
Ireland

tel: +353 (0) 58-44122
tel: +353 (0) 58-44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: **BORD NA MONA POWERGEN LTD**

Job: **BALLIVOR WIND FARM, CO. WESTMEATH/MEATH**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **DI02**

Drawing No: **P1510-0-0323-A1-D102-00A**

Sheet Size: **A1** | Project No.: **P1510-0**

Scale: **1:2,000 (A1)** | Drawn By: **GD**

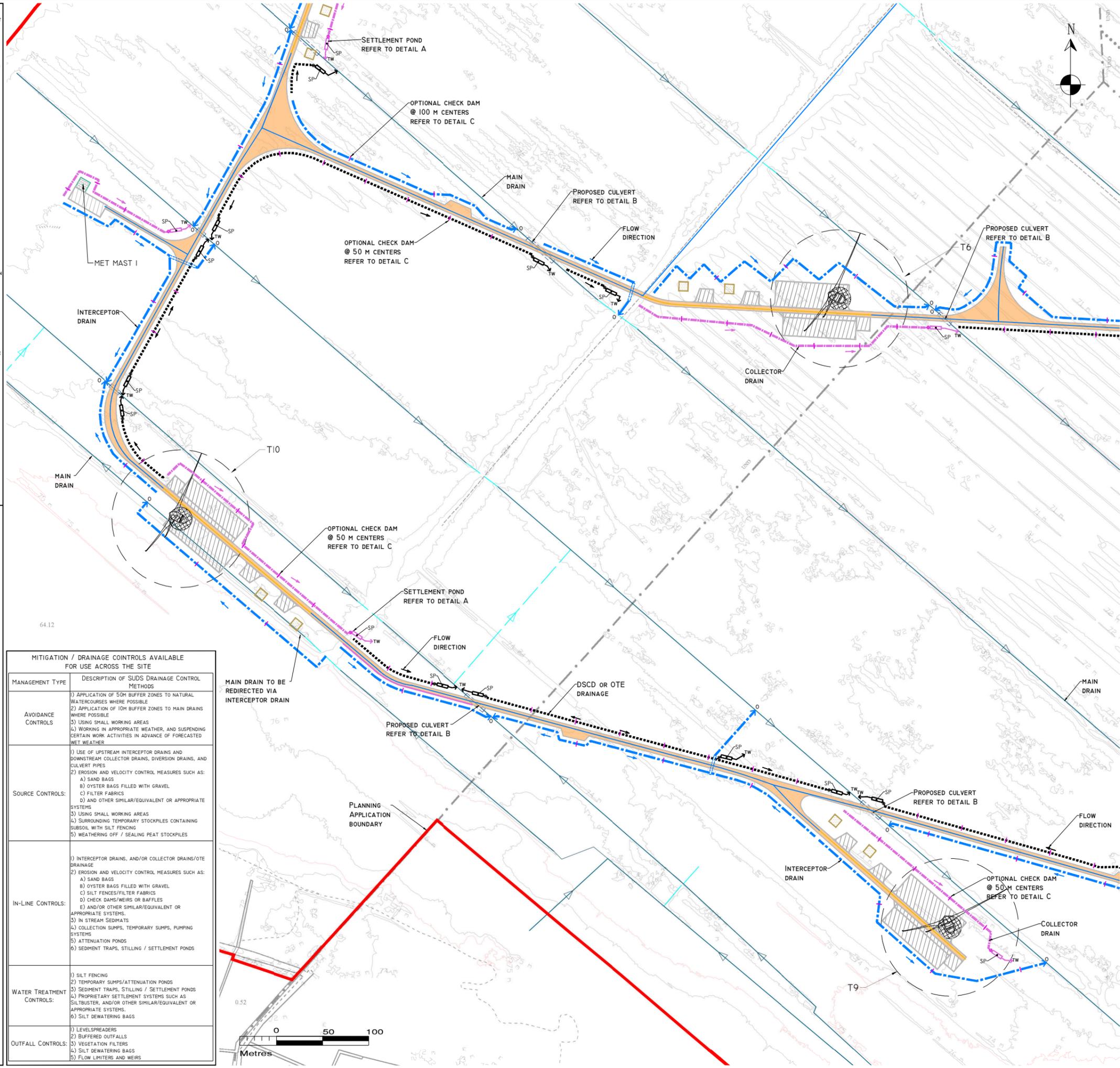
Date: **27/03/2023** | Checked By: **MG**

POLLUTION PREVENTION NOTES:

- SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
 - SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
 - SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.
- Discharges**
- WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
 - NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
 - PUMPED WATER WILL BE DIRECTED INTO COLLECTOR DRAINS AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
 - PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND/OR OTHER SIMILAR DISCHARGE CONTROLS.
 - VEGETATION (WHERE PRESENT) WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.
- EXCAVATIONS**
- WHERE DEEP EXCAVATIONS (>2.5M) ARE PROPOSED, CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.
- EXPOSED GROUND & STOCKPILES**
- DURING THE CONSTRUCTION PHASE, THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.
- SITE TRACKS**
- USE OF TRACK SIDE COLLECTOR DRAINS WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
 - WHERE USED, CHECK DAMS ARE TO BE INSPECTED AND CLEANED REGULARLY.
- REFUELLING**
- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / MAIN DRAINS AND OUTSIDE OF WATERCOURSE BUFFERS.
 - SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.
- CONCRETE**
- CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
 - CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE. TEMPORARY CONCRETE WASH OUT AREA WILL BE PROVIDED WHERE DEEMED NECESSARY FOR LARGER POURS
- IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:**
- STOP** - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.
- CONTAIN** - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. MAIN DRAINS AND OUTFALL ROUTES TO NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.
- NOTIFY** - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

- ACCESS TRACK SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SPARE SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, CHECK DAMS / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. WHERE REQUIRED, MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE.
- SLODS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/ OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO MAIN DRAINS AND DRAINAGE ROUTES TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR DRAINS TO BE USED TO COLLECT AND REDISTRIBUTE UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
- WHERE REQUIRED, CROSS DRAINS ARE TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN LOW POINTS. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
- WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK DRAINS.
- BATTERS OF ALL PROPOSED DRAINS TO HAVE A SLOPE OF BETWEEN 1: 1.5 TO 1: 2 DEPENDING UPON DEPTH OF DRAIN AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE DRAINS TO SHALLOW WITH MODERATE GRADIENTS TO PREVENT EROSION/SCOUR. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
- WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING D501.
- SILT FENCES OR SIMILAR, TO BE USED ALSO AROUND SUBSOIL SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING MAIN DRAINS / WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY MAIN DRAIN / EPHEMERAL CHANNELS.
- SLOPES OF THE DRAINS TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED/PROTECTIVE LAYER ('PEAT' 'SOIL' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY FOR REUSE DURING LANDSCAPING OF STOCKPILES.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20- 40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
- BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE DRAIN.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
- OILS/FUELS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.



DRAWING LEGEND:

- RIVERS/STREAMS 50M BUFFER
- STREAM FLOW DIRECTION
- EXISTING MAIN DRAINS
- REDIRECTED MAIN DRAINS
- EXISTING PIPED DRAINS
- EXISTING BM SETTLEMENT PONDS
- UPSTREAM INTERCEPTOR DRAIN
- DOWNSTREAM COLLECTOR DRAIN (DSCD)
- DSCD OR OTE ON THE EDGE (OTE)
- NEGATIVE DIRECTION OF FLOW
- SILT FENCES
- WF SETTLEMENT POND
- LEVEL SPREADER
- OPTIONAL CHECK DAM 'TYPE A'
- CHECK DAM 'TYPE B'
- PROPOSED CULVERTS/BRIDGES
- INTERCEPTOR DRAIN CULVERT
- COLLECTOR DRAIN CULVERT
- OVERLAND FLOW DISCHARGE
- TW TREATMENT WATER DISCHARGE
- SP WF SETTLEMENT POND

EXISTING DRAINAGE

- PLANNING APPLICATION BOUNDARY
- EXISTING GROUND SURFACE
- INTERMEDIATE CONTOUR (5 M INTERVAL)
- EXISTING GROUND SURFACE
- MINOR CONTOUR (1 M INTERVAL)
- TURBINE AND SWEEP AREA
- TURBINE FOUNDATION
- CRANE PLATFORM/HARDSTAND
- TEMPORARY ROAD
- PROPOSED WF ROAD
- FLIGHTING ROAD
- ROAD TYPE C (EXCAVATE & REPLACE)
- BORROW PIT
- SUBSTATION
- CONSTRUCTION COMPOUND
- MET MAST
- PERMANENT CAR PARK



DRAWING NOTES:

- DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
- COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
- DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
- ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044723
© Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
Dungarvan
Co. Waterford
Ireland

tel: +353 (0) 58-44122
tel: +353 (0) 58-44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: **BORD NA MONA POWERGEN LTD**

Job: **BALLIVOR WIND FARM, CO. WESTMEATH/MEATH**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D103**

Drawing No: **P1510-0-0323-A1-D103-00A**

Sheet Size: **A1** Project No.: **P1510-0**

Scale: **1:2,000 (A1)** Drawn By: **GD**
Date: **27/03/2023** Checked By: **MG**

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE

MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	<ol style="list-style-type: none"> APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE USING SMALL WORKING AREAS WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER
SOURCE CONTROLS	<ol style="list-style-type: none"> USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS, DIVERSION DRAINS, AND CULVERT PIPES EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL SILT FENCES/FILTER FABRICS AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS USING SMALL WORKING AREAS SURROUNDING TEMPORARY STOCKPILES CONTAINING SUBSOIL WITH SILT FENCING WEATHERING OFF / SEALING PEAT STOCKPILES
IN-LINE CONTROLS	<ol style="list-style-type: none"> INTERCEPTOR DRAINS, AND/OR COLLECTOR DRAINS/OTE DRAINAGE EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL SILT FENCES/FILTER FABRICS CHECK DAMS/WEIRS OR BAFFLES AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. IN STREAM SEDIMENTS COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS	<ol style="list-style-type: none"> SILT FENCING TEMPORARY SUMPS/ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. SILT DEWATERING BAGS
OUTFALL CONTROLS	<ol style="list-style-type: none"> LEVELSPREADERS BUFFERED OUTFALLS VEGETATION FILTERS SILT DEWATERING BAGS FLOW LIMITERS AND WEIRS

MAIN DRAIN TO BE REDIRECTED VIA INTERCEPTOR DRAIN



POLLUTION PREVENTION NOTES:

1. SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
2. SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
3. SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.
4. **DISCHARGES**
 4.1. WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
 5. NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
 6. PUMPED WATER WILL BE DIRECTED INTO COLLECTOR DRAINS AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
 7. PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND/OR OTHER SIMILAR DISCHARGE CONTROLS.
 8. VEGETATION (WHERE PRESENT) WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.
5. **EXCAVATIONS**
 9. WHERE DEEP EXCAVATIONS (>2.5M) ARE PROPOSED, CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF EXCESSIVE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.
6. **EXPOSED GROUND & STOCKPILES**
 10. DURING THE CONSTRUCTION PHASE, THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.
7. **SITE TRACKS**
 11. USE OF TRACK SIDE COLLECTOR DRAINS WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
 12. WHERE USED, CHECK DAMS ARE TO BE INSPECTED AND CLEANED REGULARLY.
8. **REFUELLING**
 13. REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / MAIN DRAINS AND OUTSIDE OF WATERCOURSE BUFFERS.
 14. SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.
9. **CONCRETE**
 15. CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
 16. CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE. TEMPORARY CONCRETE WASH OUT AREA WILL BE PROVIDED WHERE DEEMED NECESSARY FOR LARGER POURS.

IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:

STOP - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

CONTAIN - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. MAIN DRAINS AND OUTFALL ROUTES TO NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.

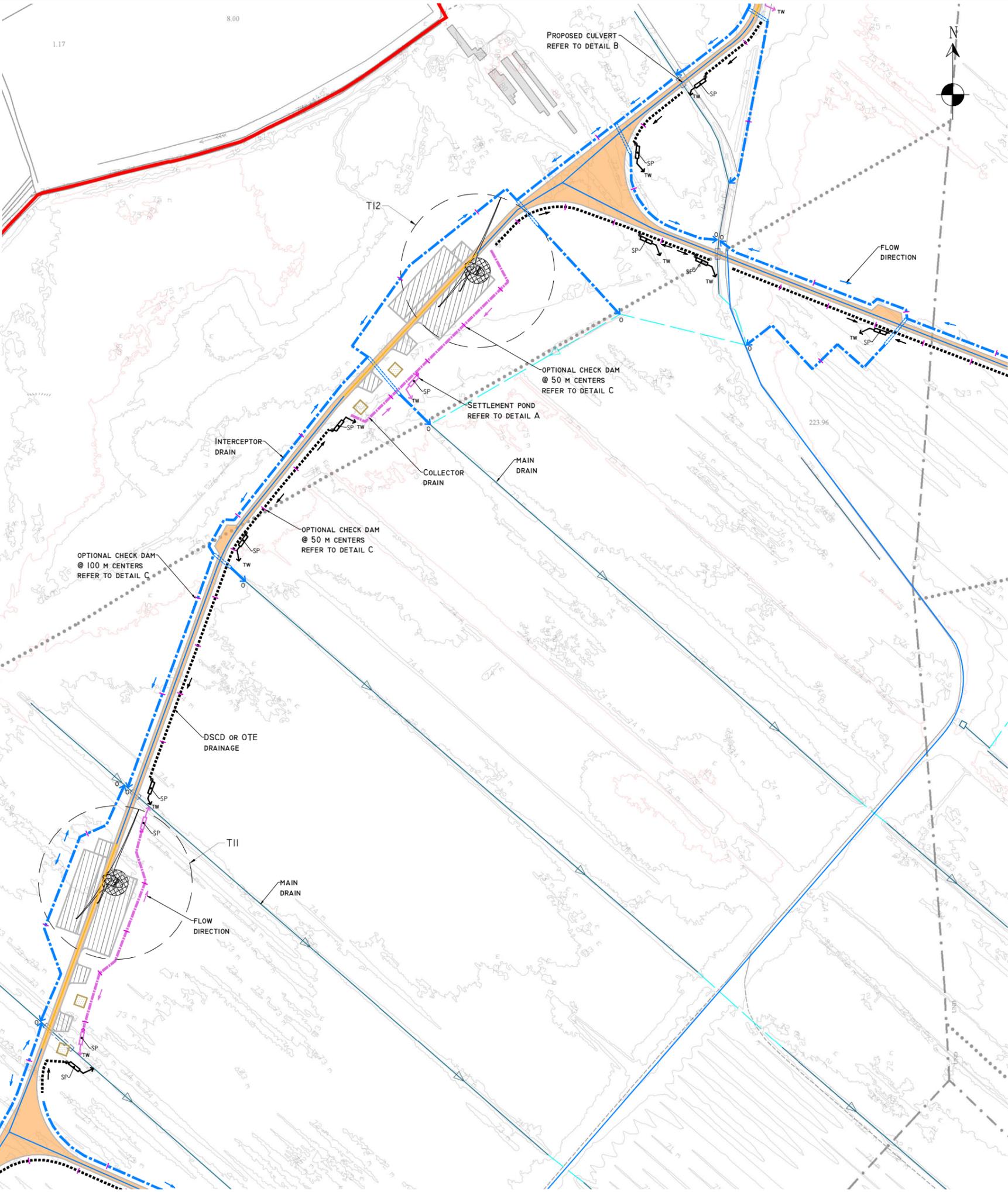
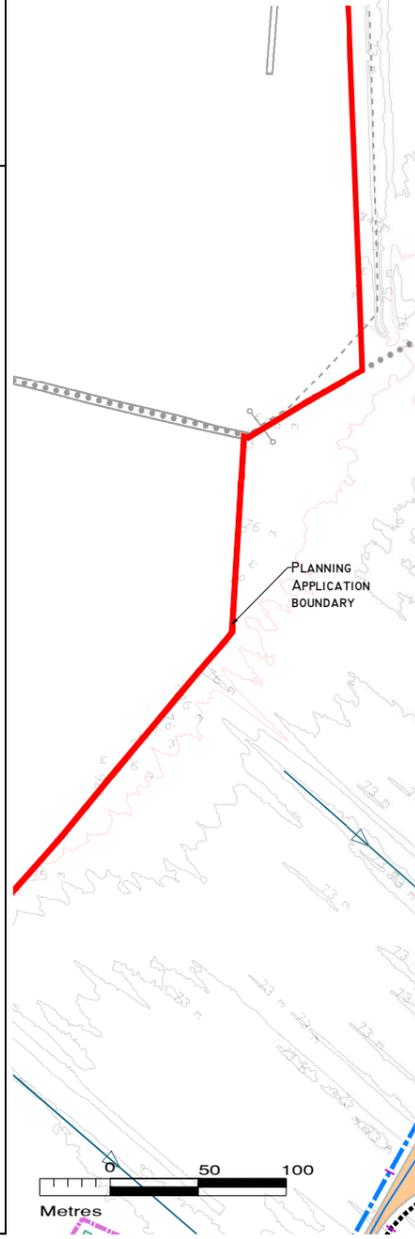
NOTIFY - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

1. ACCESS TRACK SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
2. SPARE SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, CHECK DAMS / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS, WHERE REQUIRED, MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE.
3. SLODS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
4. SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO MAIN DRAINS AND DRAINAGE ROUTES TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
5. INTERCEPTOR DRAINS TO BE USED TO COLLECT AND REDISTRIBUTE UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS. WHERE REQUIRED, CROSS DRAINS ARE TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN LOW POINTS. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
6. WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK DRAINS.
7. BATTERS OF ALL PROPOSED DRAINS TO HAVE A SLOPE OF BETWEEN 1 : 1.5 TO 1 : 2 DEPENDING UPON DEPTH OF DRAIN AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
8. TRACK SIDE DRAINS TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT EROSION/SCOUR. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
9. WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING D501.
10. SILT FENCES OR SIMILAR, TO BE USED ALSO AROUND SUBSOIL SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
11. SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING MAIN DRAINS / WATERCOURSE WHERE WORKS COMES WITHIN 45M OF EDGE OF ANY MAIN DRAIN / EPHEMERAL CHANNELS.
12. SLOPES OF THE DRAINS TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (PEAT 'SOO' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY FOR REUSE DURING LANDSCAPING OF STOCKPILES.
13. AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
14. CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
15. BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
16. SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE DRAIN.
17. LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
18. OILS/FUELS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
19. SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE

MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	1) APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE 2) APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE 3) USING SMALL WORKING AREAS 4) WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER
SOURCE CONTROLS	1) USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS, DIVERSION DRAINS, AND CULVERT PIPES 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) FILTER FABRICS D) AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 3) USING SMALL WORKING AREAS 4) SURROUNDING TEMPORARY STOCKPILES CONTAINING SUBSOIL WITH SILT FENCING 5) WEATHERING OFF / SEALING PEAT STOCKPILES
IN-LINE CONTROLS	1) INTERCEPTOR DRAINS, AND/OR COLLECTOR DRAINS/OTE DRAINAGE 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) SILT FENCES/FILTER FABRICS D) CHECK DAMS/WEIRS OR BAFFLES E) AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. 3) IN STREAM SEDIMENTS 4) COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS 5) ATTENUATION PONDS 6) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS	1) SILT FENCING 2) TEMPORARY SUMPS/ATTENUATION PONDS 3) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS 4) PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. 5) SILT DEWATERING BAGS
OUTFALL CONTROLS	1) LEVELSPREADERS 2) BUFFERED OUTFALLS 3) VEGETATION FILTERS 4) SILT DEWATERING BAGS 5) FLOW LIMITERS AND WEIRS

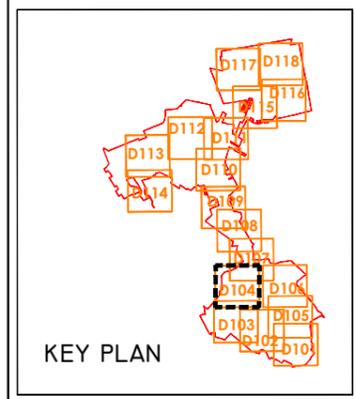


DRAWING LEGEND:

- RIVERS/STREAMS
- RIVERS/STREAMS 50M BUFFER
- STREAM FLOW DIRECTION
- EXISTING MAIN DRAINS
- REDIRECTED MAIN DRAINS
- EXISTING PAVED DRAINS
- EXISTING BM SETTLEMENT PONDS
- UPSTREAM INTERCEPTOR DRAIN
- DOWNSTREAM COLLECTOR DRAIN (DSCD)
- DSCD OR OTE (OTE)
- INDICATIVE DIRECTION OF FLOW
- SILT FENCES
- WF SETTLEMENT POND
- LEVEL SPREADER
- OPTIONAL CHECK DAM 'TYPE A'
- CHECK DAM 'TYPE B'
- PROPOSED CULVERTS/BRIDGES
- INTERCEPTOR DRAIN CULVERT
- COLLECTOR DRAIN CULVERT
- OVERLAND FLOW DISCHARGE
- TREATED WATER DISCHARGE
- WF SETTLEMENT POND

EXISTING DRAINAGE

- PLANNING APPLICATION BOUNDARY
- EXISTING GROUND SURFACE
- INTERMEDIATE CONTOUR (5 M INTERVAL)
- EXISTING GROUND SURFACE
- HIGH CONTOUR (1 M INTERVAL)
- TURBINE AND SWIFT AREA
- TURBINE FOUNDATION
- CRANE PLATFORM/HARDSTAND
- TEMPORARY ROAD
- PROPOSED WF ROAD
- FLIGHTING ROAD
- ROAD TYPE C (EXCAVATE & REPLACE)
- BORROW PIT
- SUBSTATION
- CONSTRUCTION COMPOUND
- HET HAST
- PERMANENT CAR PARK



DRAWING NOTES:

1. DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
2. COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
3. DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
4. ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044723
 © Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed
Revisions			

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
 Dunganavan
 Co. Waterford
 Ireland

tel: +353 (0) 58-44122
 tel: +353 (0) 58-44244
 email: info@hydroenvironmental.ie
 web: www.hydroenvironmental.ie

Client: **BORD NA MONA POWERGEN LTD**

Job: **BALLIVOR WIND FARM, CO. WESTMEATH/MEATH**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D104**

Drawing No: **P1510-0-0323-A1-D104-00A**

Sheet Size: **A1** Project No.: **P1510-0**
 Scale: **1:2,000 (A1)** Drawn By: **GD**
 Date: **27/03/2023** Checked By: **MG**

POLLUTION PREVENTION NOTES:

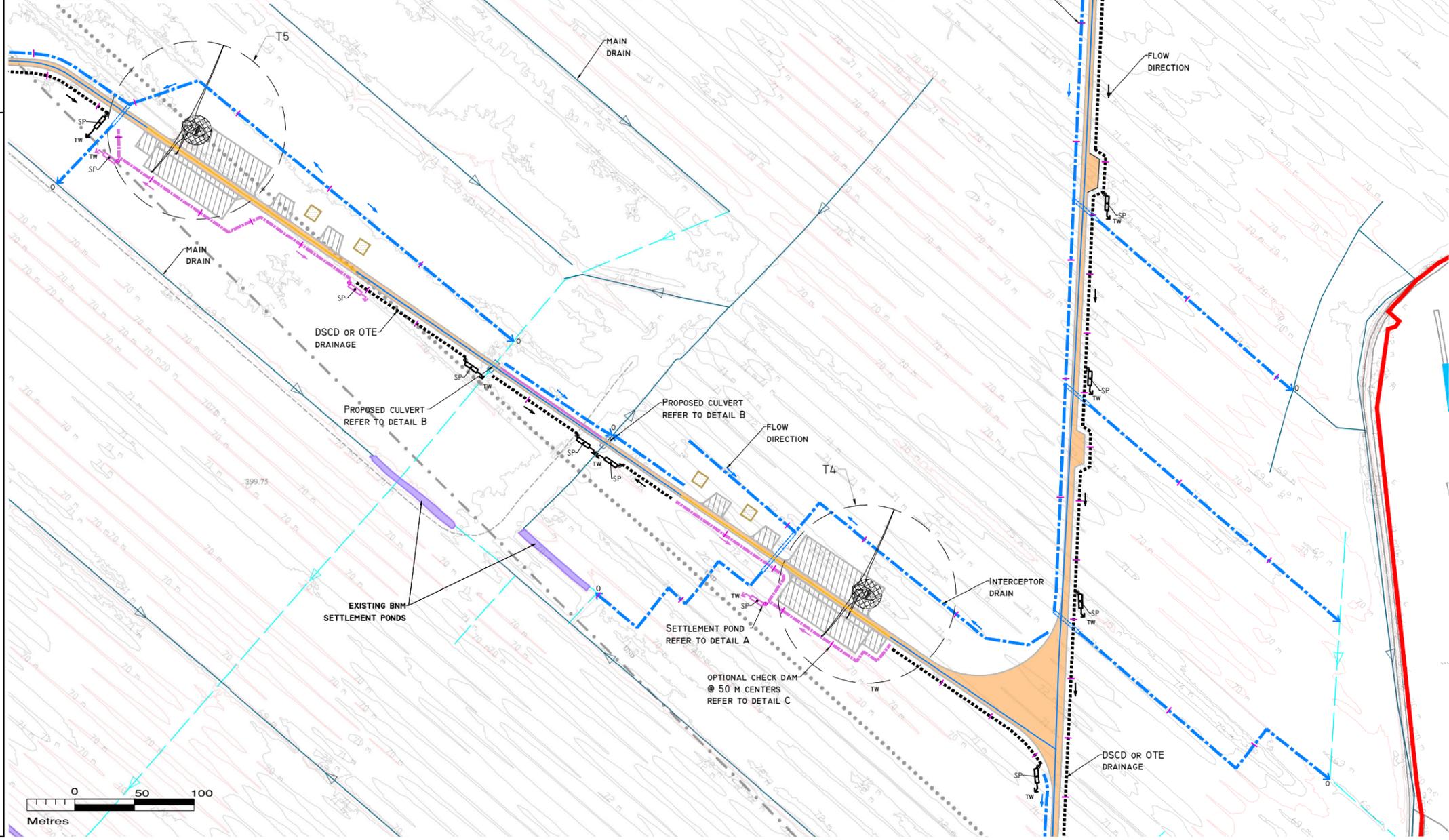
- SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SLTATION AND EROSION.
 - SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
 - SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.
 - DISCHARGES**
 - WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
 - NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
 - PUMPED WATER WILL BE DIRECTED INTO COLLECTOR DRAINS AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
 - PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND/OR OTHER SIMILAR DISCHARGE CONTROLS.
 - VEGETATION (WHERE PRESENT) WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.
 - EXCAVATIONS**
 - WHERE DEEP EXCAVATIONS (>2.5M) ARE PROPOSED, CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.
 - EXPOSED GROUND & STOCKPILES**
 - DURING THE CONSTRUCTION PHASE, THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.
 - SITE TRACKS**
 - USE OF TRACK SIDE COLLECTOR DRAINS WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
 - WHERE USED, CHECK DAMS ARE TO BE INSPECTED AND CLEANED REGULARLY.
 - REFUELLING**
 - REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / MAIN DRAINS AND OUTSIDE OF WATERCOURSE BUFFERS.
 - SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.
 - CONCRETE**
 - CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
 - CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE. TEMPORARY CONCRETE WASH OUT AREA WILL BE PROVIDED WHERE DEEMED NECESSARY FOR LARGER POURS.
- IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:**
- STOP** - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.
- CONTAIN** - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. MAIN DRAINS AND OUTFALL ROUTES TO NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.
- NOTIFY** - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

- ACCESS TRACK SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SPARE SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, CHECK DAMS / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. WHERE REQUIRED, MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE.
- SLODS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/ OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO MAIN DRAINS AND DRAINAGE ROUTES TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR DRAINS TO BE USED TO COLLECT AND REDISTRIBUTE UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS. WHERE REQUIRED, CROSS DRAINS ARE TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN LOW POINTS. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
- WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK DRAINS.
- BATTERS OF ALL PROPOSED DRAINS TO HAVE A SLOPE OF BETWEEN 1:1.5 TO 1:2 DEPENDING UPON DEPTH OF DRAIN AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE DRAINS TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT EROSION/SCOUR. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
- WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING DSOI.
- SILT FENCES OR SIMILAR, TO BE USED ALSO AROUND SUBSOIL SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING MAIN DRAINS / WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY MAIN DRAIN / EPHEMERAL CHANNELS.
- SLOPES OF THE DRAINS TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (PEAT 'SOO' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY FOR REUSE DURING LANDSCAPING OF STOCKPILES.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
- BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE DRAIN.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBRANKMENT AROUND THE POND.
- OILS/FUELS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE

MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	<ol style="list-style-type: none"> APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE USING SMALL WORKING AREAS WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER
SOURCE CONTROLS	<ol style="list-style-type: none"> USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS, DIVERSION DRAINS, AND CULVERT PIPES EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL FILTER FABRICS AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS USING SMALL WORKING AREAS SURROUNDING TEMPORARY STOCKPILES CONTAINING SUBSOIL WITH SILT FENCING WEATHERING OFF / SEALING PEAT STOCKPILES
IN-LINE CONTROLS	<ol style="list-style-type: none"> INTERCEPTOR DRAINS, AND/OR COLLECTOR DRAINS/OTE DRAINAGE EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL SILT FENCES/FILTER FABRICS CHECK DAMS/WEIRS OR BAFFLES AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. IN STREAM SEDIMENTS COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS	<ol style="list-style-type: none"> SILT FENCING TEMPORARY SUMPS/ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. SILT DEWATERING BAGS
OUTFALL CONTROLS	<ol style="list-style-type: none"> LEVELSPREADERS BUFFERED OUTFALLS VEGETATION FILTERS SILT DEWATERING BAGS FLOW LIMITERS AND WEIRS



DRAWING LEGEND:

- RIVERS/STREAMS 50M BUFFER
- STREAM FLOW DIRECTION
- EXISTING MAIN DRAINS
- RECTIFIED MAIN DRAINS
- EXISTING PAVED DRAINS
- EXISTING BNM SETTLEMENT PONDS
- UPSTREAM INTERCEPTOR DRAIN
- DOWNSTREAM COLLECTOR DRAIN (DSCD)
- DSCD OR OVER THE EDGE (OTE)
- INDICATIVE DIRECTION OF FLOW
- SILT FENCES
- WF SETTLEMENT POND
- LEVEL SPREADER
- OPTIONAL CHECK DAM TYPE 'A'
- CHECK DAM TYPE 'B'
- PROPOSED CULVERTS/BRIDGES
- INTERCEPTOR DRAIN CULVERT
- COLLECTOR DRAIN CULVERT
- OVERLAND FLOW DISCHARGE
- TURBINE WATER DISCHARGE
- WF SETTLEMENT POND

EXISTING DRAINAGE

PROPOSED DRAINAGE

PLANNING APPLICATION BOUNDARY

EXISTING GROUND SURFACE

INTERMEDIATE CONTOUR (5 M INTERVAL)

EXISTING GROUND SURFACE

HIGH CONTOUR (1 M INTERVAL)

TURBINE AND SWIFT AREA

TURBINE FOUNDATION

CRANE PLATFORM/HARDSTAND

TEMPORARY ROAD

PROPOSED WF ROAD

FLOATING ROAD

ROAD TYPE C (EXCAVATE & REPLACE)

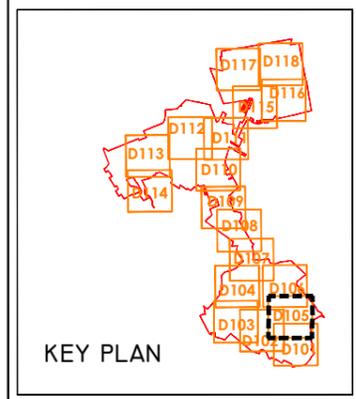
BORROW PIT

SUBSTATION

CONSTRUCTION COMPOUND

HET HAST

PERMANENT CAR PARK



DRAWING NOTES

- DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
- COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
- DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
- ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044723
© Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed

Revisions

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
Dungarvan
Co. Waterford
Ireland

tel: +353 (0) 58-44122
tel: +353 (0) 58-44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: **BORD NA MONA POWERGEN LTD**

Job: **BALLIVOR WIND FARM, CO. WESTMEATH/MEATH**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D105**

Drawing No: **P1510-0-0323-A1-D105-00A**

Sheet Size: **A1** Project No.: **P1510-0**

Scale: **1:2,000 (A1)** Drawn By: **GD**

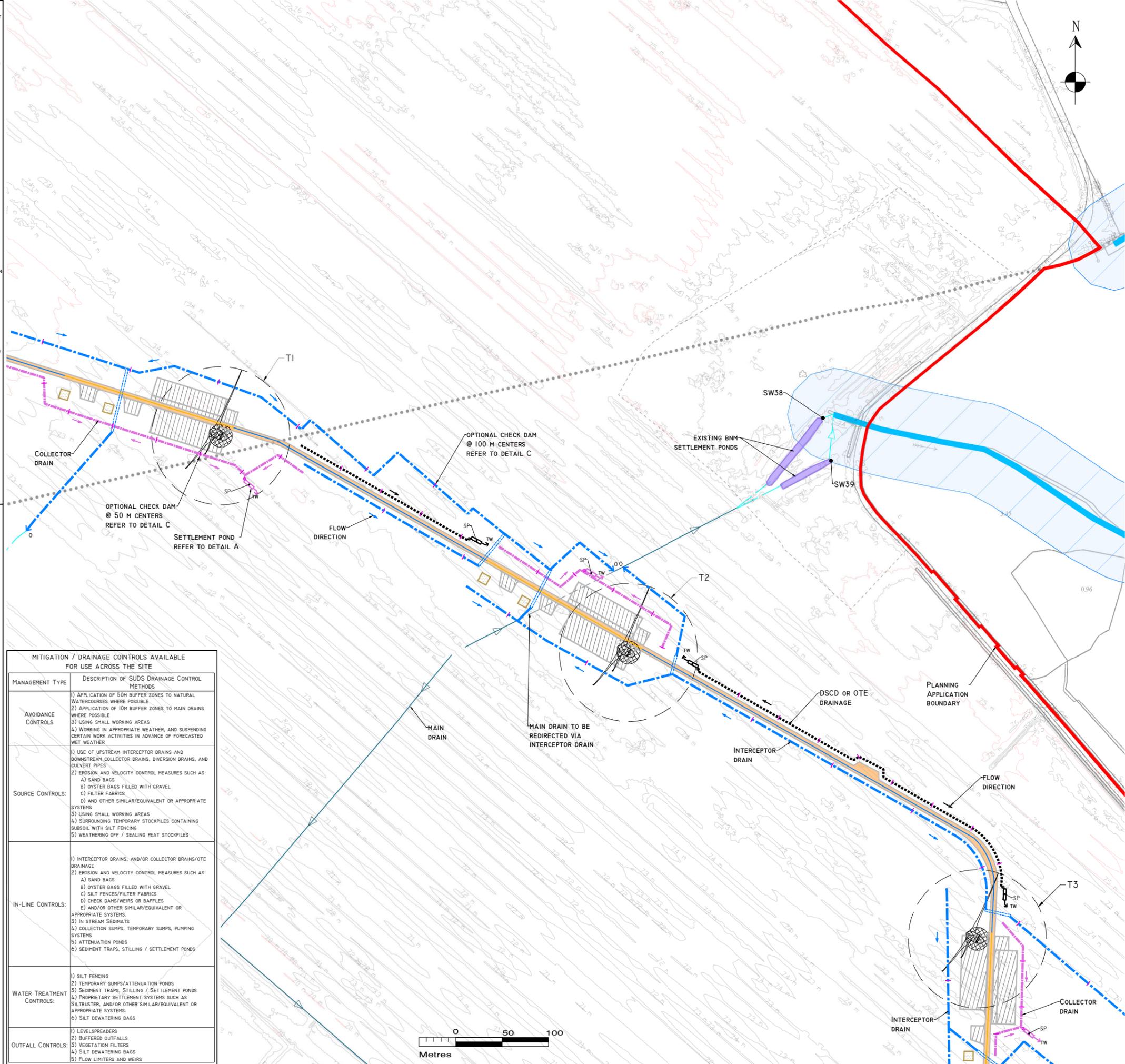
Date: **27/03/2023** Checked By: **MG**

POLLUTION PREVENTION NOTES:

- SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
 - SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
 - SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.
- DISCHARGES**
- WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
 - NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
 - PUMPED WATER WILL BE DIRECTED INTO COLLECTOR DRAINS AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
 - PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND/OR OTHER SIMILAR DISCHARGE CONTROLS.
 - VEGETATION (WHERE PRESENT) WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.
- EXCAVATIONS**
- WHERE DEEP EXCAVATIONS (>2.5M) ARE PROPOSED, CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.
- EXPOSED GROUND & STOCKPILES**
- DURING THE CONSTRUCTION PHASE, THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.
- SITE TRACKS**
- USE OF TRACK SIDE COLLECTOR DRAINS WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
 - WHERE USED, CHECK DAMS ARE TO BE INSPECTED AND CLEANED REGULARLY.
- REFUELLING**
- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / MAIN DRAINS AND OUTSIDE OF WATERCOURSE BUFFERS.
 - SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.
- CONCRETE**
- CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
 - CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE. TEMPORARY CONCRETE WASH OUT AREA WILL BE PROVIDED WHERE DEEMED NECESSARY FOR LARGER POURS.
- IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:**
- STOP** - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.
- CONTAIN** - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. MAIN DRAINS AND OUTFALL ROUTES TO NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.
- NOTIFY** - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

- ACCESS TRACK SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SPARE SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, CHECK DAMS / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS, WHERE REQUIRED, MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE.
- SLODS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO MAIN DRAINS AND DRAINAGE ROUTES TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR DRAINS TO BE USED TO COLLECT AND REDISTRIBUTE UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
- WHERE REQUIRED, CROSS DRAINS ARE TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN LOW POINTS. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
- WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK DRAINS.
- BATTERS OF ALL PROPOSED DRAINS TO HAVE A SLOPE OF BETWEEN 1:1.5 TO 1:2 DEPENDING UPON DEPTH OF DRAIN AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE DRAINS TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT EROSION/SCOUR. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
- WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING D501.
- SILT FENCES OR SIMILAR, TO BE USED ALSO AROUND SUBSOIL SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING MAIN DRAINS / WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY MAIN DRAIN / EPHEMERAL CHANNELS.
- SLOPES OF THE DRAINS TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER ('PEAT' 'SOIL' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY FOR REUSE DURING LANDSCAPING OF STOCKPILES.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
- BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE DRAIN.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
- OILS/FUELS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.



DRAWING LEGEND:

- RIVERS/STREAMS 50M BUFFER
- STREAM FLOW DIRECTION
- EXISTING MAIN DRAINS
- REDIRECTED MAIN DRAINS
- EXISTING PAVED DRAINS
- EXISTING BNM SETTLEMENT PONDS
- UPSTREAM INTERCEPTOR DRAIN
- DOWNSTREAM COLLECTOR DRAIN (DSCD)
- DSCD OR OTE OVER THE EDGE (OTE)
- INDICATIVE DIRECTION OF FLOW
- SILT FENCES
- WF SETTLEMENT POND
- LEVEL SPREADER
- OPTIONAL CHECK DAM 'TYPE A'
- CHECK DAM 'TYPE B'
- PROPOSED CULVERTS/BRIDGES
- INTERCEPTOR DRAIN CULVERT
- COLLECTOR DRAIN CULVERT
- OVERLAND FLOW DISCHARGE
- TW TREATED WATER DISCHARGE
- SP WF SETTLEMENT POND

EXISTING DRAINAGE

PROPOSED DRAINAGE

- PLANNING APPLICATION BOUNDARY
- EXISTING GROUND SURFACE
- INTERMEDIATE CONTOUR (5 M INTERVAL)
- EXISTING GROUND SURFACE
- MINOR CONTOUR (1 M INTERVAL)
- TURBINE AND SWEEP AREA
- TURBINE FOUNDATION
- CRANE PLATFORM/HARDSTAND
- TEMPORARY ROAD
- PROPOSED WF ROAD
- FLOATING ROAD
- ROAD TYPE C (EXCAVATE & REPLACE)
- BORROW PIT
- SUBSTATION
- CONSTRUCTION COMPOUND
- HET HAST
- PERMANENT CAR PARK



DRAWING NOTES

- DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
- COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
- DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
- ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044723
© Ordnance Survey Ireland/Government of Ireland

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE	
MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	<ol style="list-style-type: none"> APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE USING SMALL WORKING AREAS WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER
SOURCE CONTROLS	<ol style="list-style-type: none"> USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS, DIVERSION DRAINS, AND CULVERT PIPES EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL FILTER FABRICS AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS USING SMALL WORKING AREAS SURROUNDING TEMPORARY STOCKPILES CONTAINING SUBSOIL WITH SILT FENCING WEATHERING OFF / SEALING FEAT STOCKPILES
IN-LINE CONTROLS	<ol style="list-style-type: none"> INTERCEPTOR DRAINS, AND/OR COLLECTOR DRAINS/OTE DRAINAGE EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL SILT FENCES/FILTER FABRICS CHECK DAMS/WEIRS OR BAFFLES AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. IN STREAM SEDIMENTS COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS	<ol style="list-style-type: none"> SILT FENCING TEMPORARY SUMPS/ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. SILT DEWATERING BAGS
OUTFALL CONTROLS	<ol style="list-style-type: none"> LEVEL SPREADERS BUFFERED OUTFALLS VEGETATION FILTERS SILT DEWATERING BAGS FLOW LIMITERS AND WEIRS

Date	Description	Chkd	Signed

Revisions

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
Dungarvan
Co. Waterford
Ireland

tel: +353 (0) 58-44122
tel: +353 (0) 58-44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: **BORD NA MONA POWERGEN LTD**

Job: **BALLIVOR WIND FARM, CO. WESTMEATH/MEATH**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **DI06**

Drawing No: **P1510-0-0323-A1-D106-00A**

Sheet Size: **A1** Project No.: **P1510-0**
Scale: **1:2,000 (A1)** Drawn By: **GD**
Date: **27/03/2023** Checked By: **MG**

POLLUTION PREVENTION NOTES:

- SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SLTATION AND EROSION.
- SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
- SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH. SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.
- DISCHARGES**
 - WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
 - NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
 - PUMPED WATER WILL BE DIRECTED INTO COLLECTOR DRAINS AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
 - PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND/OR OTHER SIMILAR DISCHARGE CONTROLS.
 - VEGETATION (WHERE PRESENT) WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.
- EXCAVATIONS**
 - WHERE DEEP EXCAVATIONS (>2.5M) ARE PROPOSED, CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.
- EXPOSED GROUND & STOCKPILES**
 - DURING THE CONSTRUCTION PHASE, THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.
- SITE TRACKS**
 - USE OF TRACK SIDE COLLECTOR DRAINS WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
 - WHERE USED, CHECK DAMS ARE TO BE INSPECTED AND CLEANED REGULARLY.
- REFUELLING**
 - REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / MAIN DRAINS AND OUTSIDE OF WATERCOURSE BUFFERS.
 - SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.
- CONCRETE**
 - CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
 - CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE. TEMPORARY CONCRETE WASH OUT AREA WILL BE PROVIDED WHERE DEEMED NECESSARY FOR LARGER POURS.

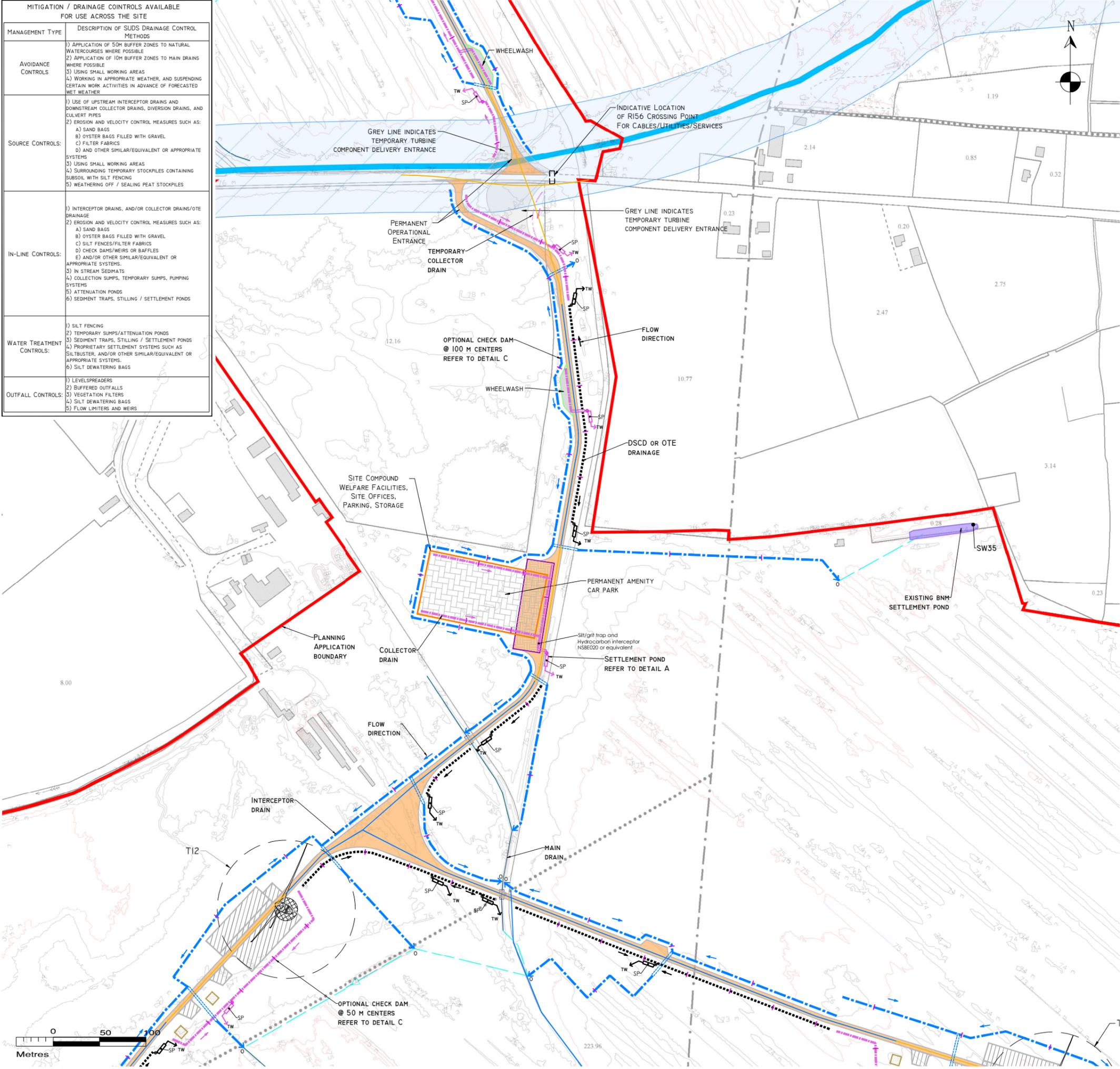
IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:

- STOP** - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.
- CONTAIN** - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. MAIN DRAINS AND OUTFALL ROUTES TO NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.
- NOTIFY** - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

- ACCESS TRACK SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SPARE SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, CHECK DAMS / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS, WHERE REQUIRED, MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE.
- SUDS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/ OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO MAIN DRAINS AND DRAINAGE ROUTES TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR DRAINS TO BE USED TO COLLECT AND REDISTRIBUTE UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS. WHERE REQUIRED, CROSS DRAINS ARE TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN LOW POINTS. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
- WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK DRAINS.
- BATTERS OF ALL PROPOSED DRAINS TO HAVE A SLOPE OF BETWEEN 1 : 1.5 TO 1 : 2 DEPENDING UPON DEPTH OF DRAIN AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE DRAINS TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT EROSION/SCOUR. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
- WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING DSOI.
- SILT FENCES OR SIMILAR, TO BE USED ALSO AROUND SUBSOIL SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING MAIN DRAINS / WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY MAIN DRAIN / EPHEMERAL CHANNELS.
- SLOPES OF THE DRAINS TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (PEAT 'SOO' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY FOR REUSE DURING LANDSCAPING OF STOCKPILES.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
- BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE DRAIN.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMANKMENT AROUND THE POND.
- OILS/FUELS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE	
MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	<ol style="list-style-type: none"> APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE USING SMALL WORKING AREAS WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER
SOURCE CONTROLS	<ol style="list-style-type: none"> USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS, DIVERSION DRAINS, AND CULVERT PIPES EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL FILTER FABRICS AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS USING SMALL WORKING AREAS SURROUNDING TEMPORARY STOCKPILES CONTAINING SUBSOIL WITH SILT FENCING WEATHERING OFF / SEALING PEAT STOCKPILES
IN-LINE CONTROLS	<ol style="list-style-type: none"> INTERCEPTOR DRAINS, AND/OR COLLECTOR DRAINS/OTE DRAINAGE EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL SILT FENCES/FILTER FABRICS CHECK DAMS/WEIRS OR BAFFLES AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. IN STREAM SEDIMENTS COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS	<ol style="list-style-type: none"> SILT FENCING TEMPORARY SUMPS/ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. SILT DEWATERING BAGS
OUTFALL CONTROLS	<ol style="list-style-type: none"> LEVELSPREADERS BUFFERED OUTFALLS VEGETATION FILTERS SILT DEWATERING BAGS FLOW LIMITERS AND WEIRS



DRAWING LEGEND:

- RIVERS/STREAMS
- RIVERS/STREAMS 50M BUFFER
- STREAM FLOW DIRECTION
- DRAINS
- EXISTING MAIN DRAINS
- REDIRECTED MAIN DRAINS
- EXISTING PAVED DRAINS
- EXISTING BNM SETTLEMENT PONDS
- UPSTREAM INTERCEPTOR DRAIN
- DOWNSTREAM COLLECTOR DRAIN (DSCD)
- DSCD OR OTE OVER THE EDGE (OTE)
- INDICATIVE DIRECTION OF FLOW
- SILT FENCES
- WF SETTLEMENT POND
- LEVEL SPREADER
- OPTIONAL CHECK DAM TYPE 'A'
- CHECK DAM TYPE 'B'
- PROPOSED CULVERTS/BRIDGES
- INTERCEPTOR DRAIN CULVERT
- COLLECTOR DRAIN CULVERT
- OVERLAND FLOW DISCHARGE
- TREATED WATER DISCHARGE
- WF SETTLEMENT POND

EXISTING DRAINAGE (Blue lines)

PROPOSED DRAINAGE (Red, Orange, Green lines)

PLANNING APPLICATION BOUNDARY (Red line)

EXISTING GROUND SURFACE (Brown contour lines)

INTERMEDIATE GROUND SURFACE (Dotted brown contour lines)

EXISTING GROUND SURFACE (Solid brown contour lines)

TURBINE AND SWIFT AREA (Black circle)

TURBINE FOUNDATION (Black square)

CRANE PLATFORM/HARDSTAND (Grey rectangle)

TEMPORARY ROAD (Blue dashed line)

PROPOSED WF ROAD (Red dashed line)

FLOATING ROAD (Blue solid line)

ROAD TYPE C (EXCAVATE & REPLACE) (Yellow dashed line)

BORROW PIT (Yellow rectangle)

SUBSTATION (Yellow rectangle)

CONSTRUCTION COMPOUND (Orange rectangle)

HET MAST (Green rectangle)

PERMANENT CAR PARK (Green rectangle)



- DRAWING NOTES:**
- DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
 - COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
 - DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
 - ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044723
© Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed

Revisions

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
Dungarvan
Co. Waterford
Ireland

tel: +353 (0) 58-44122
tel: +353 (0) 58-44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: **BORD NA MONA POWERGEN LTD**

Job: **BALLIVOR WIND FARM, CO. WESTMEATH/MEATH**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D107**

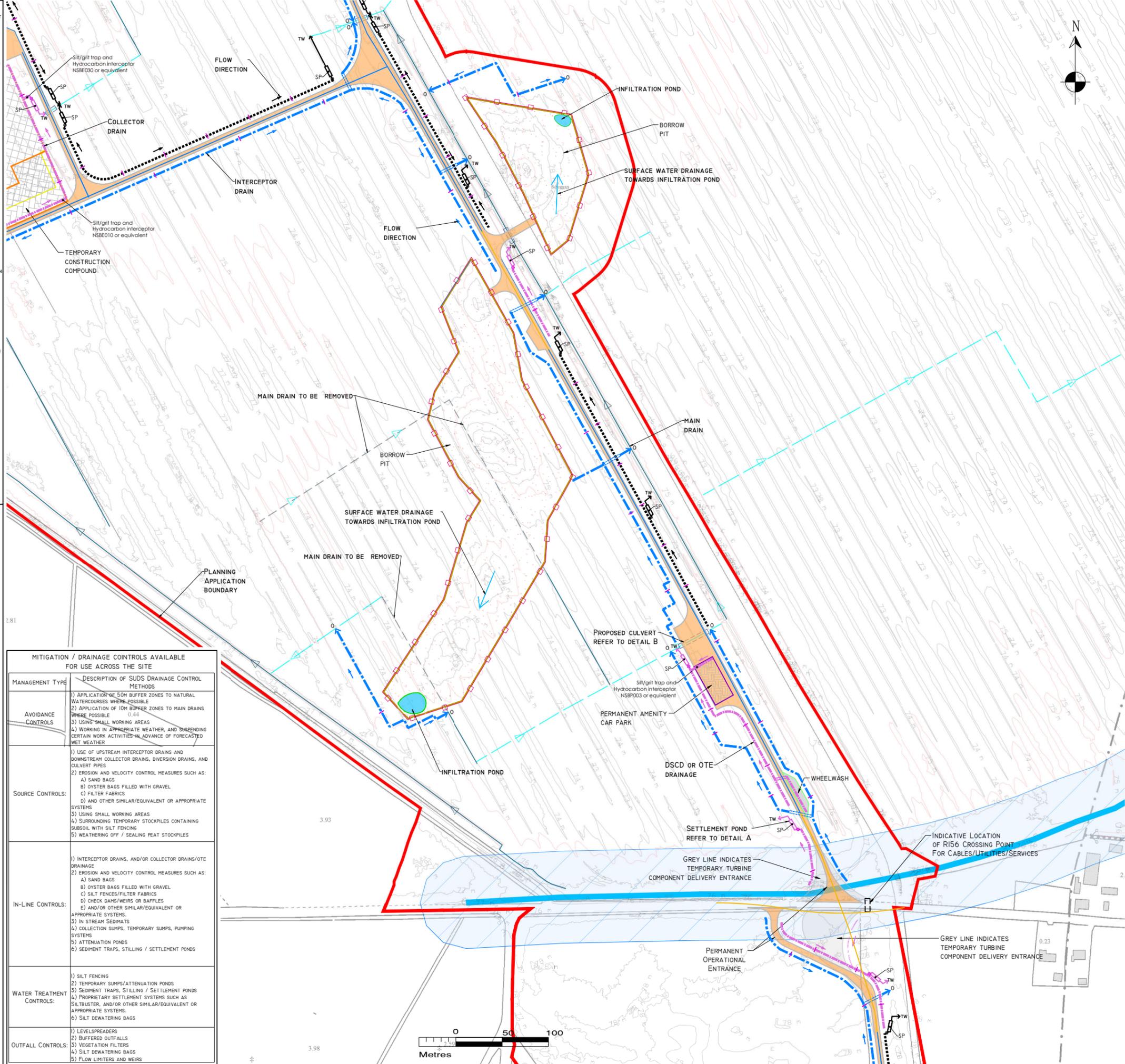
Drawing No: P1510-0-0323-A1-D107-00A	Project No.: P1510-0
Sheet Size: A1	Drawn By: GD
Scale: 1:2,000 (A1)	Checked By: MG
Date: 27/03/2023	

POLLUTION PREVENTION NOTES:

- SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
 - SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
 - SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.
- DISCHARGES**
- WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
 - NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
 - PUMPED WATER WILL BE DIRECTED INTO COLLECTOR DRAINS AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
 - PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND/OR OTHER SIMILAR DISCHARGE CONTROLS.
 - VEGETATION (WHERE PRESENT) WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.
- EXCAVATIONS**
- WHERE DEEP EXCAVATIONS (>2.5M) ARE PROPOSED, CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.
- EXPOSED GROUND & STOCKPILES**
- DURING THE CONSTRUCTION PHASE, THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.
- SITE TRACKS**
- USE OF TRACK SIDE COLLECTOR DRAINS WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
 - WHERE USED, CHECK DAMS ARE TO BE INSPECTED AND CLEANED REGULARLY.
- REFUELLING**
- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / MAIN DRAINS AND OUTSIDE OF WATERCOURSE BUFFERS.
 - SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.
- CONCRETE**
- CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
 - CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE. TEMPORARY CONCRETE WASH OUT AREA WILL BE PROVIDED WHERE DEEMED NECESSARY FOR LARGER POURS.
- IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:**
- STOP** - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.
- CONTAIN** - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. MAIN DRAINS AND OUTFALL ROUTES TO NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.
- NOTIFY** - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

- ACCESS TRACK SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SPARE SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, CHECK DAMS / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS, WHERE REQUIRED, MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE.
- SUDS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/ OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO MAIN DRAINS AND DRAINAGE ROUTES TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR DRAINS TO BE USED TO COLLECT AND REDISTRIBUTE UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS. WHERE REQUIRED, CROSS DRAINS ARE TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN LOW POINTS. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
- WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK DRAINS.
- BATTERS OF ALL PROPOSED DRAINS TO HAVE A SLOPE OF BETWEEN 1 : 1.5 TO 1 : 2 DEPENDING UPON DEPTH OF DRAIN AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE DRAINS TO SHALLOW WITH MODERATE GRADIENTS TO PREVENT EROSION/SCOUR. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
- WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING D501.
- SILT FENCES OR SIMILAR, TO BE USED ALSO AROUND SUBSOIL SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING MAIN DRAINS / WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY MAIN DRAIN / EPHEMERAL CHANNELS.
- SLOPES OF THE DRAINS TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (PEAT 'SOO' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY FOR REUSE DURING LANDSCAPING OF STOCKPILES.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
- BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE DRAIN.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
- OILS/FUELS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.



MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE	
MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	1) APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE 2) APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE 3) USING SMALL WORKING AREAS 4) WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER
SOURCE CONTROLS	1) USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS, DIVERSION DRAINS, AND CULVERT PIPES 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) SILT FENCES/FILTER FABRICS D) AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 3) USING SMALL WORKING AREAS 4) SURROUNDING TEMPORARY STOCKPILES CONTAINING SUBSOIL WITH SILT FENCING 5) WEATHERING OFF / SEALING FEAT STOCKPILES
IN-LINE CONTROLS	1) INTERCEPTOR DRAINS, AND/OR COLLECTOR DRAINS/OTE DRAINAGE 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) SILT FENCES/FILTER FABRICS D) CHECK DAMS/WEIRS OR Baffles E) AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. 3) IN STREAM SEDIMENTS 4) COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS 5) ATTENUATION PONDS 6) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS	1) SILT FENCING 2) TEMPORARY SUMPS/ATTENUATION PONDS 3) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS 4) PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. 5) SILT DEWATERING BAGS
OUTFALL CONTROLS	1) LEVELSPREADERS 2) BUFFERED OUTFALLS 3) VEGETATION FILTERS 4) SILT DEWATERING BAGS 5) FLOW LIMITERS AND WEIRS

DRAWING LEGEND:

- RIVERS/STREAMS 50M BUFFER
- STREAM FLOW DIRECTION
- EXISTING MAIN DRAINS
- REDIRECTED MAIN DRAINS
- EXISTING PAVED DRAINS
- EXISTING BM SETTLEMENT PONDS
- UPSTREAM INTERCEPTOR DRAIN
- DOWNSTREAM COLLECTOR DRAIN (DSCD)
- DSCD OR OTE (OTE)
- INDICATIVE DIRECTION OF FLOW
- SILT FENCES
- WF SETTLEMENT POND
- LEVEL SPREADER
- OPTIONAL CHECK DAM 'TYPE A'
- CHECK DAM 'TYPE B'
- PROPOSED CULVERTS/BRIDGES
- INTERCEPTOR DRAIN CULVERT
- COLLECTOR DRAIN CULVERT
- OVERLAND FLOW DISCHARGE
- TREATED WATER DISCHARGE
- WF SETTLEMENT POND

EXISTING DRAINAGE

PROPOSED DRAINAGE

- PLANNING APPLICATION BOUNDARY
- EXISTING GROUND SURFACE
- INTERMEDIATE CONTOUR (5 M INTERVAL)
- EXISTING GROUND SURFACE
- MINOR CONTOUR (1 M INTERVAL)
- TURBINE AND SWEEP AREA
- TURBINE FOUNDATION
- CRANE PLATFORM/HARDSTAND
- TEMPORARY ROAD
- TEMPORARY ROAD
- PROPOSED WF ROAD
- FLOATING ROAD
- ROAD TYPE C (EXCAVATE & REPLACE)
- BORROW PIT
- SUBSTATION
- CONSTRUCTION COMPOUND
- HET MAST
- PERMANENT CAR PARK



DRAWING NOTES

- DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
- COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
- DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
- ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. E1N 0044723
 © Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
 Dunganvar
 Co. Wexford
 Ireland

tel: +353 (0) 58-441122
 tel: +353 (0) 58-44244
 email: info@hydroenvironmental.ie
 web: www.hydroenvironmental.ie

Client: **BORD NA MONA POWERGEN LTD**

Job: **BALLIVOR WIND FARM, Co. WESTMEATH/MEATH**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D108**

Drawing No: **P1510-0-0323-A1-D108-00A**

Sheet Size: **A1** Project No.: **P1510-0**
 Scale: **1:2,000 (A1)** Drawn By: **GD**
 Date: **27/03/2023** Checked By: **MG**



POLLUTION PREVENTION NOTES:

- SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
- SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
- SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.

DISCHARGES

- WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
- NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
- PUMPED WATER WILL BE DIRECTED INTO COLLECTOR DRAINS AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
- PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND/OR OTHER SIMILAR DISCHARGE CONTROLS.
- VEGETATION (WHERE PRESENT) WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.

EXCAVATIONS

- WHERE DEEP EXCAVATIONS (>2.5M) ARE PROPOSED, CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.

EXPOSED GROUND & STOCKPILES

- DURING THE CONSTRUCTION PHASE, THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.

SITE TRACKS

- USE OF TRACK SIDE COLLECTOR DRAINS WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
- WHERE USED, CHECK DAMS ARE TO BE INSPECTED AND CLEANED REGULARLY.

REFUELLING

- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / MAIN DRAINS AND OUTSIDE OF WATERCOURSE BUFFERS.
- SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.

CONCRETE

- CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
- CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE. TEMPORARY CONCRETE WASH OUT AREA WILL BE PROVIDED WHERE DEEMED NECESSARY FOR LARGER POURS.

IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:

STOP - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

CONTAIN - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. MAIN DRAINS AND OUTFALL ROUTES TO NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.

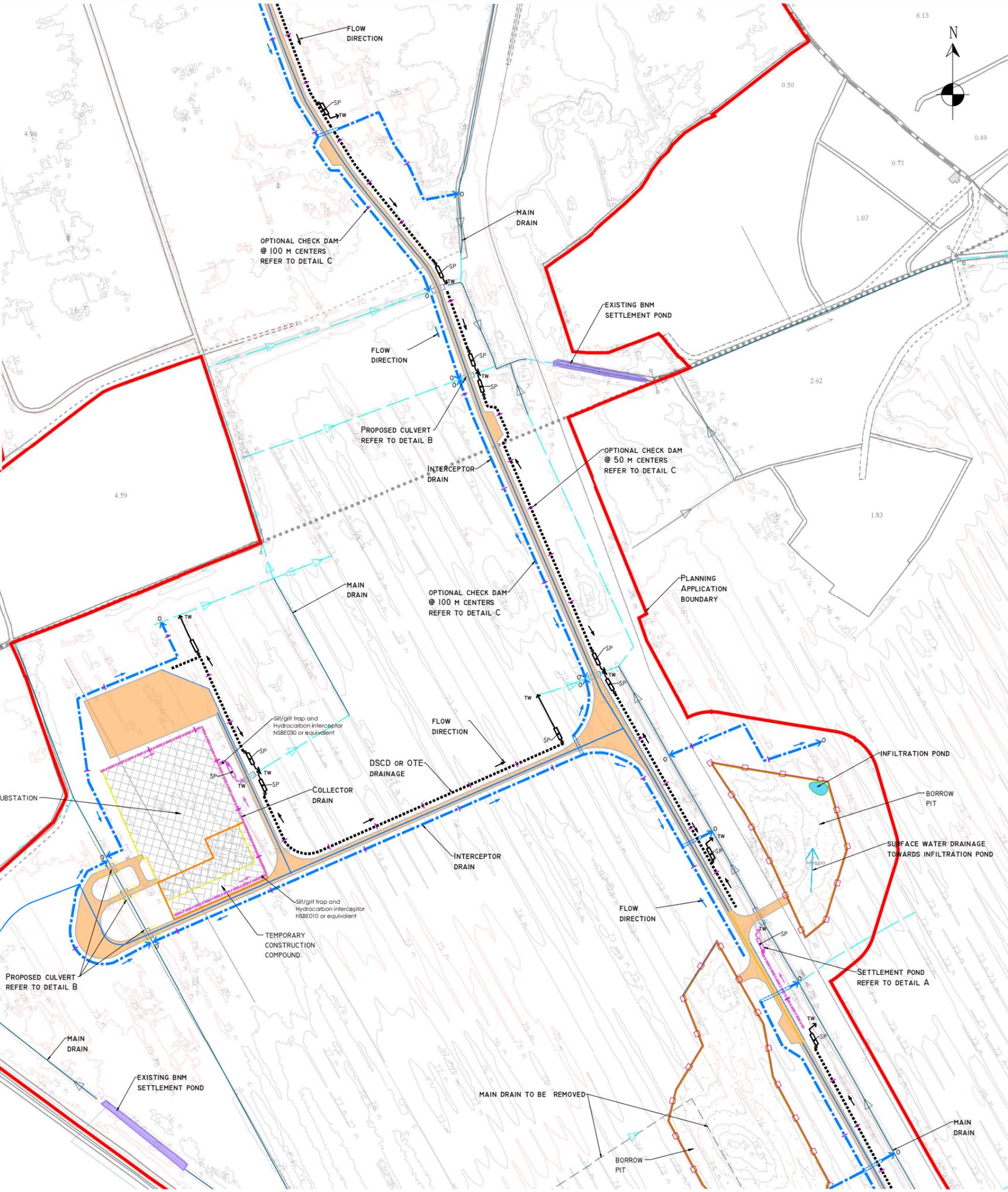
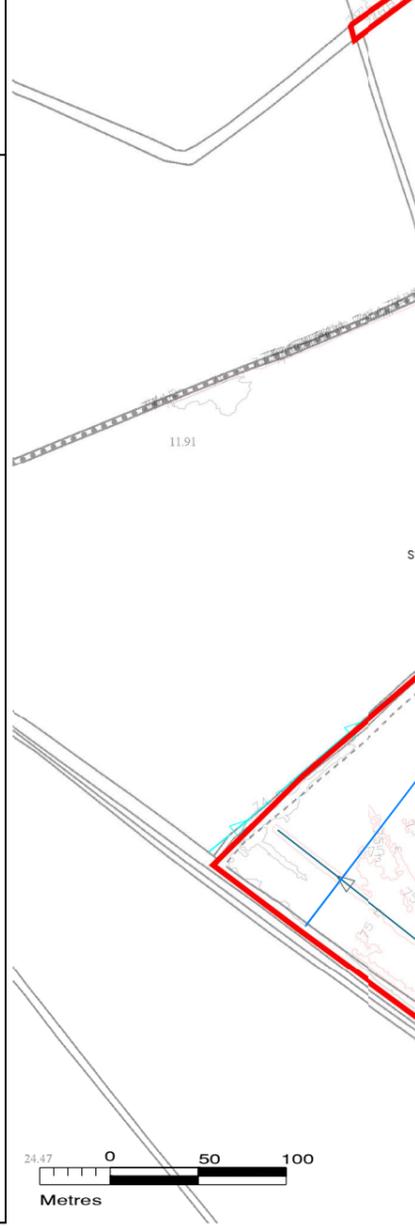
NOTIFY - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

- ACCESS TRACK SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SPARE SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, CHECK DAMS / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS, WHERE REQUIRED, MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE.
- SUDS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO MAIN DRAINS AND DRAINAGE ROUTES TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR DRAINS TO BE USED TO COLLECT AND REDISTRIBUTE UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
- WHERE REQUIRED, CROSS DRAINS ARE TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN LOW POINTS. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
- WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK DRAINS.
- BATTERS OF ALL PROPOSED DRAINS TO HAVE A SLOPE OF BETWEEN 1:1.5 TO 1:2 DEPENDING UPON DEPTH OF DRAIN AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE DRAINS TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT EROSION/SCOUR. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
- WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING D501.
- SILT FENCES OR SIMILAR, TO BE USED ALSO AROUND SUBSOIL SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING MAIN DRAINS / WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY MAIN DRAIN / EPHEMERAL CHANNELS.
- SLOPES OF THE DRAINS TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (PEAT 'SOO' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY FOR REUSE DURING LANDSCAPING OF STOCKPILES.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
- BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE DRAIN.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
- OILS/FUELS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE

MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	<ol style="list-style-type: none"> APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE USING SMALL WORKING AREAS WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER
SOURCE CONTROLS	<ol style="list-style-type: none"> USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS, DIVERSION DRAINS, AND CULVERT PIPES EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL FILTER FABRICS AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS USING SMALL WORKING AREAS SURROUNDING TEMPORARY STOCKPILES CONTAINING SUBSOIL WITH SILT FENCING WEATHERING OFF / SEALING PEAT STOCKPILES
IN-LINE CONTROLS	<ol style="list-style-type: none"> INTERCEPTOR DRAINS, AND/OR COLLECTOR DRAINS/OTE DRAINAGE EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL SILT FENCES/FILTER FABRICS CHECK DAMS/WEIRS OR BAFFLES AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. IN STREAM SEDIMENTS COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS	<ol style="list-style-type: none"> SILT FENCING TEMPORARY SUMPS/ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. SILT DEWATERING BAGS
OUTFALL CONTROLS	<ol style="list-style-type: none"> LEVELSPREADERS BUFFERED OUTFALLS VEGETATION FILTERS SILT DEWATERING BAGS FLOW LIMITERS AND WEIRS



DRAWING LEGEND:

- RIVERS/STREAMS 50M BUFFER
- STREAM FLOW DIRECTION
- EXISTING MAIN DRAINS
- RECTIFIED MAIN DRAINS
- EXISTING PAVED DRAINS
- EXISTING BNM SETTLEMENT PONDS
- UPSTREAM INTERCEPTOR DRAIN
- DOWNSTREAM COLLECTOR DRAIN (DSCD)
- DSCD ON OVER THE EDGE (OTE)
- NEGATIVE DIRECTION OF FLOW
- SILT FENCES
- WF SETTLEMENT POND
- LEVEL SPREADER
- OPTIONAL CHECK DAM TYPE A
- CHECK DAM TYPE B
- PROPOSED CULVERTS/BRIDGES
- INTERCEPTOR DRAIN CULVERT
- COLLECTOR DRAIN CULVERT
- OVERLAND FLOW DISCHARGE
- TREATED WATER DISCHARGE
- WF SETTLEMENT POND

PLANNING APPLICATION BOUNDARY

- EXISTING GROUND SURFACE
- INTERMEDIATE CONTOUR (5 M INTERVAL)
- EXISTING GROUND SURFACE
- MINOR CONTOUR (1 M INTERVAL)
- TURBINE AND SWEEP AREA
- TURBINE FOUNDATION
- CRANE PLATFORM/HARDSTAND
- TEMPORARY ROAD
- PROPOSED WF ROAD
- FLIGHTING ROAD
- ROAD TYPE C (EXCAVATE & REPLACE)
- BORROW PIT
- SUBSTATION
- CONSTRUCTION COMPOUND
- HET MAST
- PERMANENT CAR PARK



DRAWING NOTES:

- DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
- COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
- DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
- ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044723
© Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed
Revisions			

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
Dungarvan
Co. Waterford
Ireland

tel: +353 (0) 58-44122
tel: +353 (0) 58-44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: **BORD NA MONA POWERGEN LTD**

Job: **BALLIVOR WIND FARM, CO. WESTMEATH/MEATH**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D109**

Drawing No: **P1510-0-0323-A1-D109-00A**

Sheet Size: **A1** Project No.: **P1510-0**

Scale: **1:2,000 (A1)** Drawn By: **GD**
Date: **27/03/2023** Checked By: **MG**

POLLUTION PREVENTION NOTES:

- SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
- SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
- SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.

DISCHARGES

- WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
- NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
- PUMPED WATER WILL BE DIRECTED INTO COLLECTOR DRAINS AND TREATED IN SETTLEMENT PONS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
- PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND/OR OTHER SIMILAR DISCHARGE CONTROLS.
- VEGETATION (WHERE PRESENT) WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.

EXCAVATIONS

- WHERE DEEP EXCAVATIONS (>2.5M) ARE PROPOSED, CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.

EXPOSED GROUND & STOCKPILES

- DURING THE CONSTRUCTION PHASE, THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.

SITE TRACKS

- USE OF TRACK SIDE COLLECTOR DRAINS WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
- WHERE USED, CHECK DAMS ARE TO BE INSPECTED AND CLEANED REGULARLY.

REFUELLING

- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / MAIN DRAINS AND OUTSIDE OF WATERCOURSE BUFFERS.
- SPLIT KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.

CONCRETE

- CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
- CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE. TEMPORARY CONCRETE WASH OUT AREA WILL BE PROVIDED WHERE DEEMED NECESSARY FOR LARGER POURS.

IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:

STOP - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

CONTAIN - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. MAIN DRAINS AND OUTFALL ROUTES TO NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.

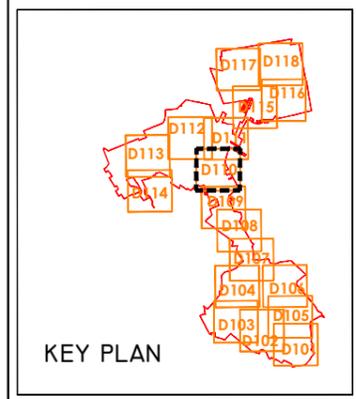
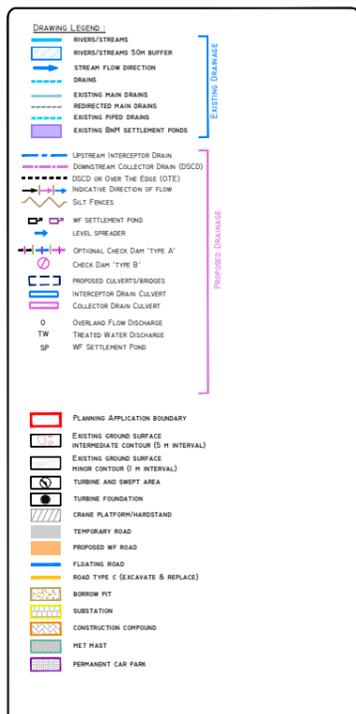
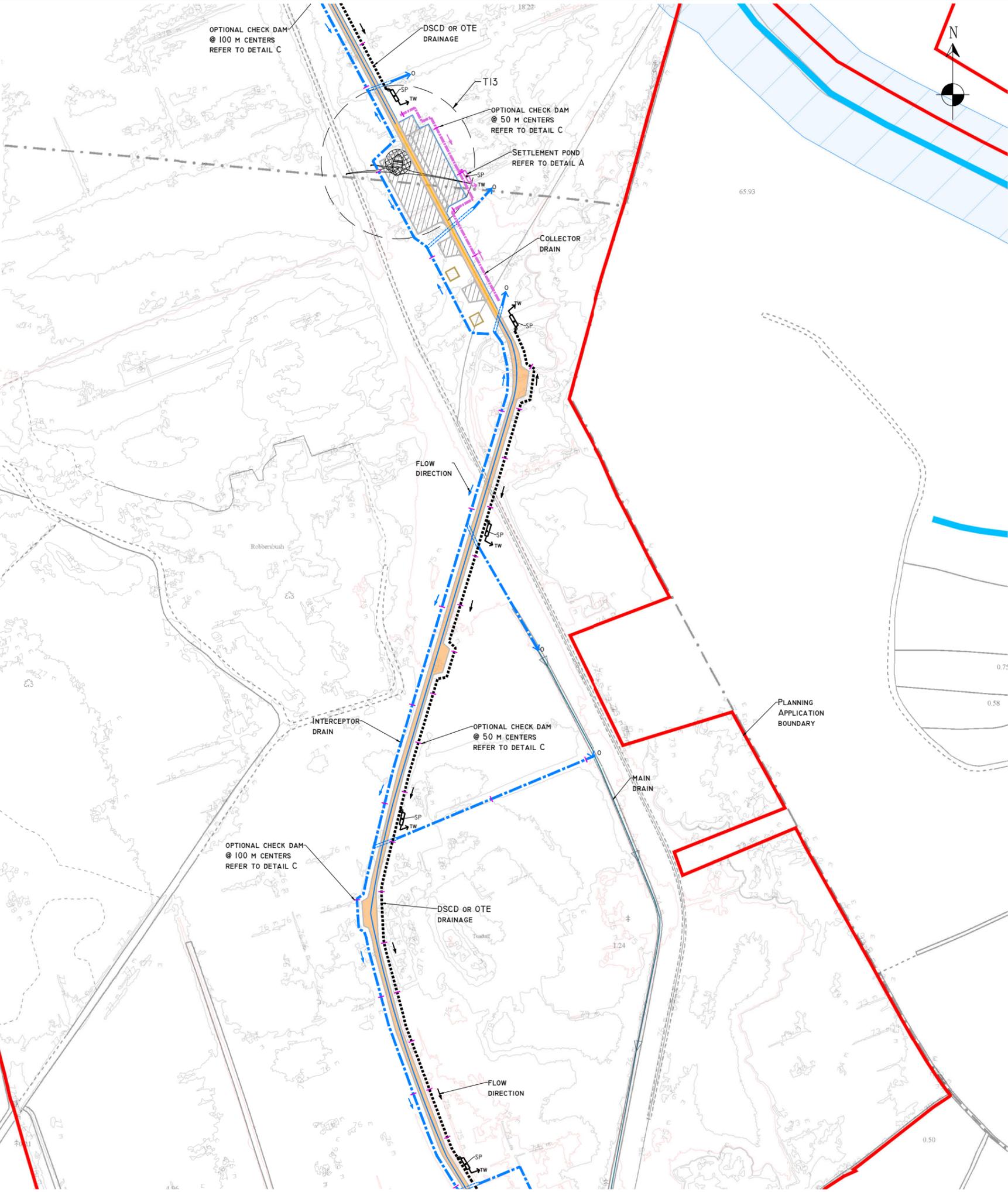
NOTIFY - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

- ACCESS TRACK SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SARE SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, CHECK DAMS / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. WHERE REQUIRED, MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE.
- SUDS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO MAIN DRAINS AND DRAINAGE ROUTES TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR DRAINS TO BE USED TO COLLECT AND REDISTRIBUTE UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
- WHERE REQUIRED, CROSS DRAINS ARE TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN LOW POINTS. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
- WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK DRAINS.
- BATTERS OF ALL PROPOSED DRAINS TO HAVE A SLOPE OF BETWEEN 1 : 1.5 TO 1 : 2 DEPENDING UPON DEPTH OF DRAIN AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE DRAINS TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT EROSION/SCOUR. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONS AND SILT TRAPS, PRIOR TO DISCHARGE.
- WIND FARM SETTLEMENT PONS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING D501.
- SILT FENCES OR SIMILAR, TO BE USED ALSO AROUND SUBSOIL SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING MAIN DRAINS / WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY MAIN DRAIN / EPHEMERAL CHANNELS.
- SLOPES OF THE DRAINS TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (PEAT 'SOO' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY FOR REUSE DURING LANDSCAPING OF STOCKPILES.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
- BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE DRAIN.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. WIND FARM SETTLEMENT PONS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
- OILS/FUELS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE

MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	<ol style="list-style-type: none"> APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE USING SMALL WORKING AREAS WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER
SOURCE CONTROLS	<ol style="list-style-type: none"> USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS, DIVERSION DRAINS, AND CULVERT PIPES EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL FILTER FABRICS AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS USING SMALL WORKING AREAS SURROUNDING TEMPORARY STOCKPILES CONTAINING SUBSOIL WITH SILT FENCING WEATHERING OFF / SEALING PEAT STOCKPILES
IN-LINE CONTROLS	<ol style="list-style-type: none"> INTERCEPTOR DRAINS, AND/OR COLLECTOR DRAINS/OTE DRAINAGE EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL SILT FENCES/FILTER FABRICS CHECK DAMS/WEIRS OR BAFFLES AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. IN STREAM SEDIMENTS COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS ATTENUATION PONS SEDIMENT TRAPS, STILLING / SETTLEMENT PONS
WATER TREATMENT CONTROLS	<ol style="list-style-type: none"> SILT FENCING TEMPORARY SUMPS/ATTENUATION PONS SEDIMENT TRAPS, STILLING / SETTLEMENT PONS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. SILT DEWATERING BAGS
OUTFALL CONTROLS	<ol style="list-style-type: none"> LEVELSPREADERS BUFFERED OUTFALLS VEGETATION FILTERS SILT DEWATERING BAGS FLOW LIMITERS AND WEIRS



DRAWING NOTES

- DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
- COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
- DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
- ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044723
© Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed
Revisions			

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
Dungarvan
Co. Waterford
Ireland

tel: +353 (0) 58-44122
tel: +353 (0) 58-44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: **BORD NA MONA POWERGEN LTD**

Job: **BALLIVOR WIND FARM, CO. WESTMEATH/MEATH**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D110**

Drawing No: **P1510-0-0323-A1-D110-E00A**

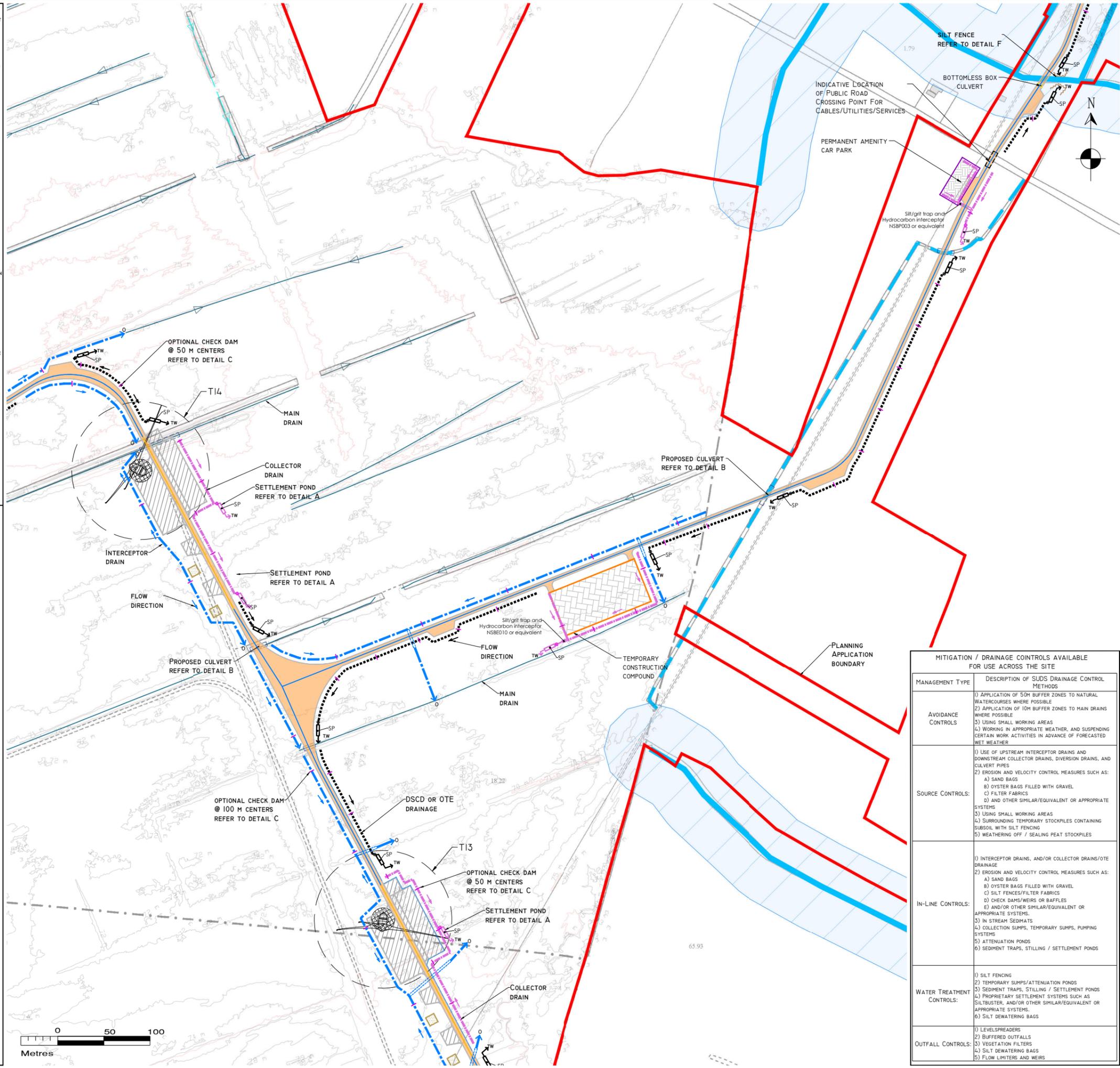
Sheet Size: **A1** Project No.: **P1510-0**
Scale: **1:2,000 (A1)** Drawn By: **GD**
Date: **27/03/2023** Checked By: **MG**

POLLUTION PREVENTION NOTES:

- SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SLTATION AND EROSION.
 - SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
 - SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.
- DISCHARGES**
- WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
 - NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
 - PUMPED WATER WILL BE DIRECTED INTO COLLECTOR DRAINS AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
 - PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND/OR OTHER SIMILAR DISCHARGE CONTROLS.
 - VEGETATION (WHERE PRESENT) WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.
- EXCAVATIONS**
- WHERE DEEP EXCAVATIONS (>2.5M) ARE PROPOSED, CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.
- EXPOSED GROUND & STOCKPILES**
- DURING THE CONSTRUCTION PHASE, THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.
- SITE TRACKS**
- USE OF TRACK SIDE COLLECTOR DRAINS WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
 - WHERE USED, CHECK DAMS ARE TO BE INSPECTED AND CLEANED REGULARLY.
- REFUELLING**
- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / MAIN DRAINS AND OUTSIDE OF WATERCOURSE BUFFERS.
 - SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.
- CONCRETE**
- CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
 - CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE. TEMPORARY CONCRETE WASH OUT AREA WILL BE PROVIDED WHERE DEEMED NECESSARY FOR LARGER POURS.
- IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:**
- STOP** - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.
- CONTAIN** - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. MAIN DRAINS AND OUTFALL ROUTES TO NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.
- NOTIFY** - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

- ACCESS TRACK SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SPARE SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, CHECK DAMS / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS, WHERE REQUIRED, MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE.
- SLDS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO MAIN DRAINS AND DRAINAGE ROUTES TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR DRAINS TO BE USED TO COLLECT AND REDISTRIBUTE UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
- WHERE REQUIRED, CROSS DRAINS ARE TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN LOW POINTS. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
- WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK DRAINS.
- BATTERS OF ALL PROPOSED DRAINS TO HAVE A SLOPE OF BETWEEN 1 : 1.5 TO 1 : 2 DEPENDING UPON DEPTH OF DRAIN AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE DRAINS TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT EROSION/SCOUR. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
- WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING DSOI.
- SILT FENCES OR SIMILAR, TO BE USED ALSO AROUND SUBSOIL SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING MAIN DRAINS / WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY MAIN DRAIN / EPHEMERAL CHANNELS.
- SLOPES OF THE DRAINS TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (PEAT 'SOO' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY FOR REUSE DURING LANDSCAPING OF STOCKPILES.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
- BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE DRAIN.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE ENBANKMENT AROUND THE POND.
- OILS/FUELS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.

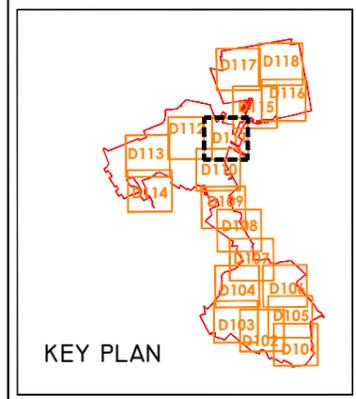


DRAWING LEGEND:

- RIVERS/STREAMS
- RIVERS/STREAMS 50M BUFFER
- STREAM FLOW DIRECTION
- DRAINING
- EXISTING MAIN DRAINS
- REDIRECTED MAIN DRAINS
- EXISTING PIPED DRAINS
- EXISTING ENH SETTLEMENT PONDS
- UPSTREAM INTERCEPTOR DRAIN
- DOWNSTREAM COLLECTOR DRAIN (DSCD)
- DSCD OR OTE THE EDGE (OTE)
- INDICATIVE DIRECTION OF FLOW
- SILT FENCES
- WF SETTLEMENT POND
- LEVEL SPREADER
- OPTIONAL CHECK DAM 'TYPE A'
- CHECK DAM 'TYPE B'
- PROPOSED CULVERTS/BRIDGES
- INTERCEPTOR DRAIN CULVERT
- COLLECTOR DRAIN CULVERT
- OVERLAND FLOW DISCHARGE
- TREATED WATER DISCHARGE
- WF SETTLEMENT POND

EXISTING DRAINAGE

- PLANNING APPLICATION BOUNDARY
- EXISTING GROUND SURFACE
- INTERMEDIATE CONTOUR (5 M INTERVAL)
- EXISTING GROUND SURFACE
- HIGH CONTOUR (1 M INTERVAL)
- TURBINE AND SWEEP AREA
- TURBINE FOUNDATION
- CRANE PLATFORM/HARDSTAND
- TEMPORARY ROAD
- PROPOSED WF ROAD
- FLIGHTING ROAD
- ROAD TYPE C (EXCAVATE & REPLACE)
- BORROW PIT
- SUBSTATION
- CONSTRUCTION COMPOUND
- HET HAST
- PERMANENT CAR PARK



DRAWING NOTES:

- DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
- COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
- DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
- ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044723
© Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
Dungarvan
Co. Waterford
Ireland

tel: +353 (0) 58-441122
tel: +353 (0) 58-44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: **BORD NA MONA POWERGEN LTD**

Job: **BALLIVOR WIND FARM, CO. WESTMEATH/MEATH**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D111**

Drawing No: **P1510-0-0323-A1-D111-00A**

Sheet Size: **A1** | Project No.: **P1510-0**

Scale: **1:2,000 (A1)** | Drawn By: **GD**

Date: **27/03/2023** | Checked By: **MG**

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE

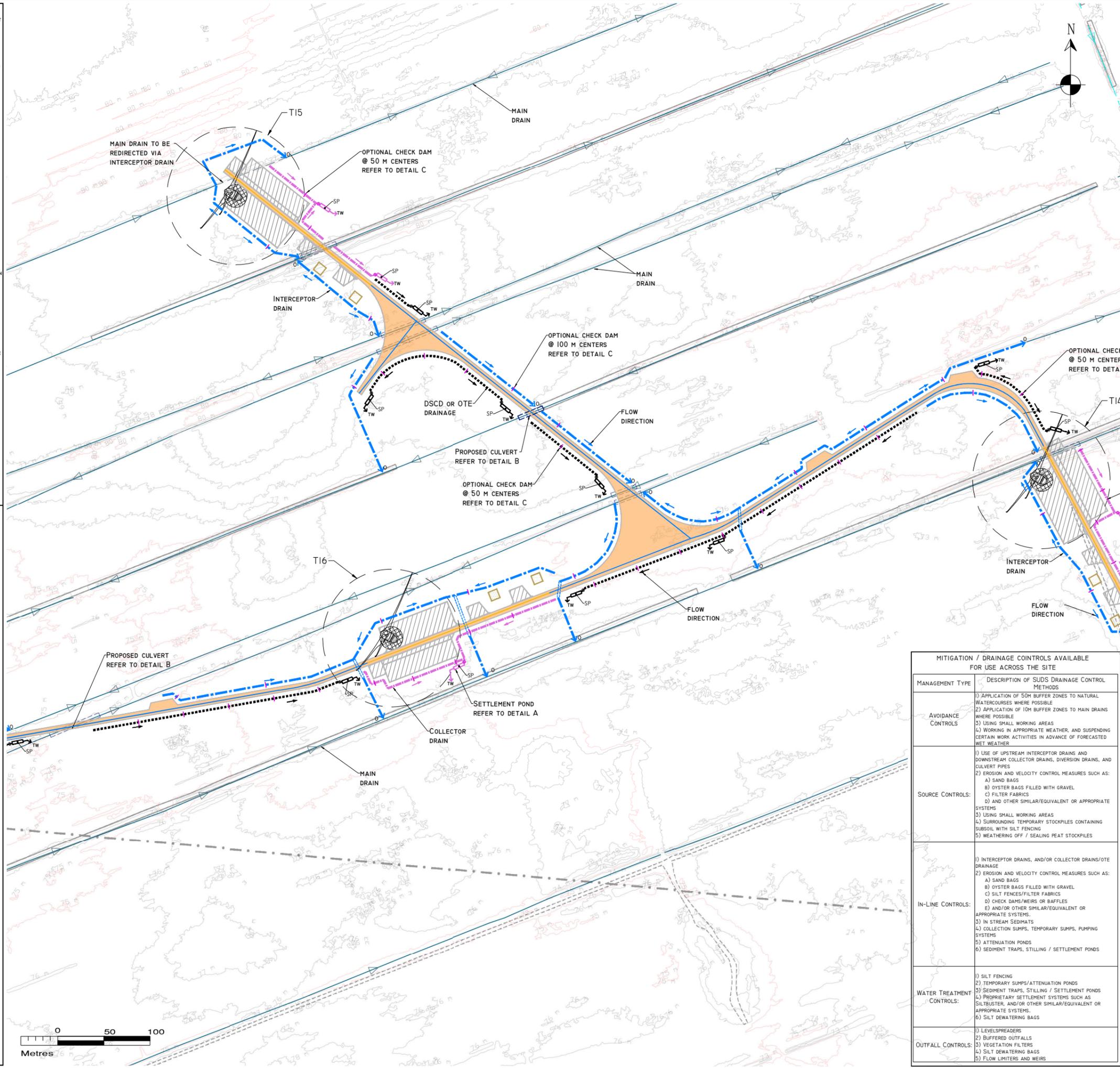
MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	<ol style="list-style-type: none"> APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE USING SMALL WORKING AREAS WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER.
SOURCE CONTROLS	<ol style="list-style-type: none"> USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS, DIVERSION DRAINS, AND CULVERT PIPES EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL FILTER FABRICS AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS USING SMALL WORKING AREAS SURROUNDING TEMPORARY STOCKPILES CONTAINING SUBSOIL WITH SILT FENCING WEATHERING OFF / SEALING PEAT STOCKPILES
IN-LINE CONTROLS	<ol style="list-style-type: none"> INTERCEPTOR DRAINS, AND/OR COLLECTOR DRAINS/OTE DRAINAGE EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL FILTER FABRICS CHECK DAMS/WEIRS OR BAFFLES AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. IN STREAM SEDIMENTS COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS	<ol style="list-style-type: none"> SILT FENCING TEMPORARY SUMPS/ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. SILT DEWATERING BAGS
OUTFALL CONTROLS	<ol style="list-style-type: none"> LEVEL SPREADERS BUFFERED OUTFALLS VEGETATION FILTERS SILT DEWATERING BAGS FLOW LIMITERS AND WEIRS

POLLUTION PREVENTION NOTES:

- SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
 - SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
 - SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.
- DISCHARGES**
- WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
 - NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
 - PUMPED WATER WILL BE DIRECTED INTO COLLECTOR DRAINS AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
 - PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND/OR OTHER SIMILAR DISCHARGE CONTROLS.
 - VEGETATION (WHERE PRESENT) WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.
- EXCAVATIONS**
- WHERE DEEP EXCAVATIONS (>2.5M) ARE PROPOSED, CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.
- EXPOSED GROUND & STOCKPILES**
- DURING THE CONSTRUCTION PHASE, THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.
- SITE TRACKS**
- USE OF TRACK SIDE COLLECTOR DRAINS WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
 - WHERE USED, CHECK DAMS ARE TO BE INSPECTED AND CLEANED REGULARLY.
- REFUELLING**
- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / MAIN DRAINS AND OUTSIDE OF WATERCOURSE BUFFERS.
 - SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.
- CONCRETE**
- CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
 - CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE. TEMPORARY CONCRETE WASH OUT AREA WILL BE PROVIDED WHERE DEEMED NECESSARY FOR LARGER POURS.
- IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:**
- STOP** - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.
- CONTAIN** - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. MAIN DRAINS AND OUTFALL ROUTES TO NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.
- NOTIFY** - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

- ACCESS TRACK SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SPARE SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, CHECK DAMS / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. WHERE REQUIRED, MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE.
- SLODS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/ OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO MAIN DRAINS AND DRAINAGE ROUTES TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR DRAINS TO BE USED TO COLLECT AND REDISTRIBUTE UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
- WHERE REQUIRED, CROSS DRAINS ARE TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN LOW POINTS. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
- WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK DRAINS.
- BATTERS OF ALL PROPOSED DRAINS TO HAVE A SLOPE OF BETWEEN 1 : 1.5 TO 1 : 2 DEPENDING UPON DEPTH OF DRAIN AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE DRAINS TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT EROSION/SCOUR. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
- WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING DSOI.
- SILT FENCES OR SIMILAR, TO BE USED ALSO AROUND SUBSOIL SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING MAIN DRAINS / WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY MAIN DRAIN / EPHEMERAL CHANNELS.
- SLOPES OF THE DRAINS TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (PEAT 'SOO' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY FOR REUSE DURING LANDSCAPING OF STOCKPILES.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20 - 40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
- BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE DRAIN.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMANKMENT AROUND THE POND.
- OILS/FUELS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.



DRAWING LEGEND:

- RIVERS/STREAMS
- RIVERS/STREAMS 50M BUFFER
- STREAM FLOW DIRECTION
- DRAINS
- EXISTING MAIN DRAINS
- REDIRECTED MAIN DRAINS
- EXISTING PAVED DRAINS
- EXISTING BM SETTLEMENT PONDS
- UPSTREAM INTERCEPTOR DRAIN
- DOWNSTREAM COLLECTOR DRAIN (DSCD)
- DSCD OR OTE OVER THE EDGE (OTE)
- INDICATIVE DIRECTION OF FLOW
- SILT FENCES
- WF SETTLEMENT POND
- LEVEL SPREADER
- OPTIONAL CHECK DAM 'TYPE A'
- CHECK DAM 'TYPE B'
- PROPOSED CULVERTS/BRIDGES
- INTERCEPTOR DRAIN CULVERT
- COLLECTOR DRAIN CULVERT
- OVERLAND FLOW DISCHARGE
- TREATED WATER DISCHARGE
- WF SETTLEMENT POND

EXISTING DRAINAGE

PROPOSED DRAINAGE

PLANNING APPLICATION BOUNDARY

EXISTING GROUND SURFACE

INTERMEDIATE CONTOUR (1 M INTERVAL)

EXISTING GROUND SURFACE

HIGH CONTOUR (1 M INTERVAL)

TURBINE AND SWEEP AREA

TURBINE FOUNDATION

CRANE PLATFORM/HARDSTAND

TEMPORARY ROAD

PROPOSED WF ROAD

FLUATING ROAD

ROAD TYPE C (EXCAVATE & REPLACE)

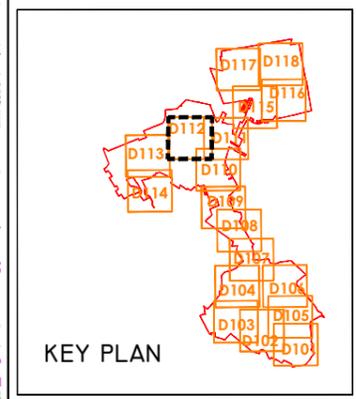
BORROW PIT

SUBSTATION

CONSTRUCTION COMPOUND

HET HAST

PERMANENT CAR PARK



KEY PLAN

DRAWING NOTES:

- DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
- COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
- DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
- ALL DIMENSIONS ARE IN METRES.

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE	
MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	<ol style="list-style-type: none"> APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE USING SMALL WORKING AREAS WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER
SOURCE CONTROLS	<ol style="list-style-type: none"> USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS, DIVERSION DRAINS, AND CULVERT PIPES EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL FILTER FABRICS AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS USING SMALL WORKING AREAS SURROUNDING TEMPORARY STOCKPILES CONTAINING SUBSOIL WITH SILT FENCING WEATHERING OFF / SEALING PEAT STOCKPILES
IN-LINE CONTROLS	<ol style="list-style-type: none"> INTERCEPTOR DRAINS, AND/OR COLLECTOR DRAINS/OTE DRAINAGE EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL SILT FENCES/FILTER FABRICS CHECK DAMS/WEIRS OR BARRIERS AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS IN STREAM SEDIMENTS COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS	<ol style="list-style-type: none"> SILT FENCING TEMPORARY SUMPS/ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS SILT DEWATERING BAGS
OUTFALL CONTROLS	<ol style="list-style-type: none"> LEVELSPREADERS BUFFERED OUTFALLS VEGETATION FILTERS SILT DEWATERING BAGS FLOW LIMITERS AND WEIRS

Ordnance Survey Ireland Licence No. EN 0044723
© Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed

Revisions

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
Dungarvan
Co. Waterford
Ireland

tel: +353 (0) 58-44122
tel: +353 (0) 58-44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: BORD NA MONA POWERGEN LTD

Job: BALLIVOR WIND FARM, CO. WESTMEATH/MEATH

Title: PROPOSED DRAINAGE LAYOUT

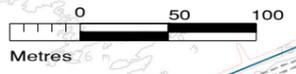
Figure No: DI12

Drawing No: P1510-0-0323-A1-D12-00A

Sheet Size: A1 **Project No.:** P1510-0

Scale: 1:2,000 (A1) **Drawn By:** GD

Date: 27/03/2023 **Checked By:** MG



POLLUTION PREVENTION NOTES:

- SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
- SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
- SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.

DISCHARGES

- WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
- NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
- PUMPED WATER WILL BE DIRECTED INTO COLLECTOR DRAINS AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
- PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND/OR OTHER SIMILAR DISCHARGE CONTROLS.
- VEGETATION (WHERE PRESENT) WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.

EXCAVATIONS

- WHERE DEEP EXCAVATIONS (>2.5M) ARE PROPOSED, CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.

EXPOSED GROUND & STOCKPILES

- DURING THE CONSTRUCTION PHASE, THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.

SITE TRACKS

- USE OF TRACK SIDE COLLECTOR DRAINS WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
- WHERE USED, CHECK DAMS ARE TO BE INSPECTED AND CLEANED REGULARLY.

REFUELLING

- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / MAIN DRAINS AND OUTSIDE OF WATERCOURSE BUFFERS.
- SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.

CONCRETE

- CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
- CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE. TEMPORARY CONCRETE WASH OUT AREA WILL BE PROVIDED WHERE DEEMED NECESSARY FOR LARGER POURS.

IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:

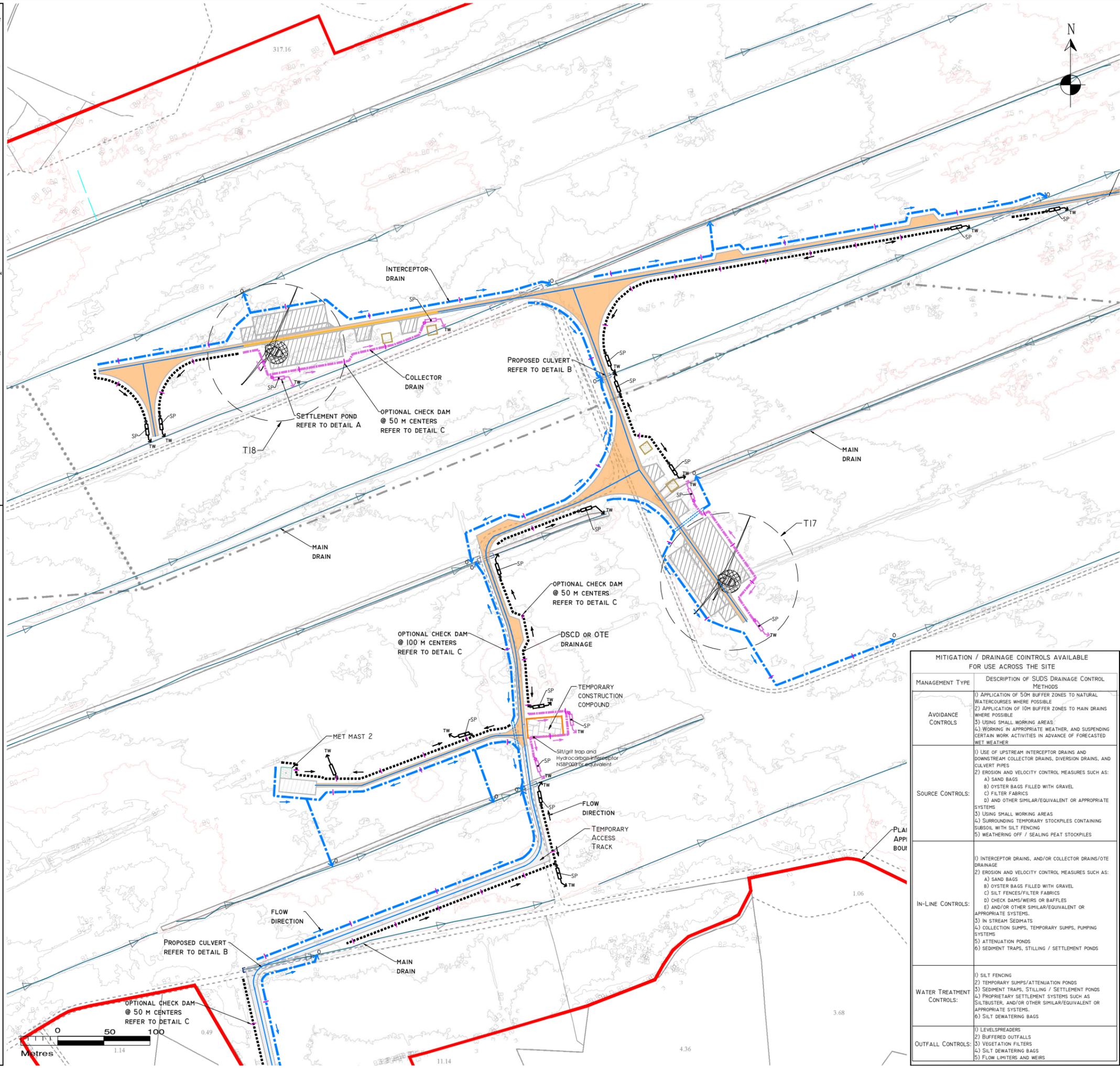
STOP - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

CONTAIN - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. MAIN DRAINS AND OUTFALL ROUTES TO NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.

NOTIFY - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

- ACCESS TRACK SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SPARE SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, CHECK DAMS / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. WHERE REQUIRED, MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE.
- SUDS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/ OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO MAIN DRAINS AND DRAINAGE ROUTES TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR DRAINS TO BE USED TO COLLECT AND REDISTRIBUTE UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
- WHERE REQUIRED, CROSS DRAINS ARE TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN LOW POINTS. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
- WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK DRAINS.
- BATTERS OF ALL PROPOSED DRAINS TO HAVE A SLOPE OF BETWEEN 1:1.5 TO 1:2 DEPENDING UPON DEPTH OF DRAIN AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE DRAINS TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT EROSION/SCOUR. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
- WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING D501.
- SILT FENCES OR SIMILAR, TO BE USED ALSO AROUND SUBSOIL SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING MAIN DRAINS / WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY MAIN DRAIN / EPHEMERAL CHANNELS.
- SLOPES OF THE DRAINS TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER ('SOO' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY FOR REUSE DURING LANDSCAPING OF STOCKPILES.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
- BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE DRAIN.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
- OILS/FUELS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.



DRAWING LEGEND:

- RIVERS/STREAMS
- RIVERS/STREAMS 50M BUFFER
- STREAM FLOW DIRECTION
- DRAINS
- EXISTING MAIN DRAINS
- REDIRECTED MAIN DRAINS
- EXISTING PIPED DRAINS
- EXISTING 6M² SETTLEMENT PONDS
- UPSTREAM INTERCEPTOR DRAIN
- DOWNSTREAM COLLECTOR DRAIN (DSCD)
- DSCD OR OTE (OTE)
- INDICATIVE DIRECTION OF FLOW
- SILT FENCES
- WF SETTLEMENT POND
- LEVEL SPREADER
- OPTIONAL CHECK DAM 'TYPE A'
- CHECK DAM 'TYPE B'
- PROPOSED CULVERTS/BRIDGES
- INTERCEPTOR DRAIN CULVERT
- COLLECTOR DRAIN CULVERT
- OVERLAND FLOW DISCHARGE
- TW TREATED WATER DISCHARGE
- SP WF SETTLEMENT POND

EXISTING DRAINAGE

PROPOSED DRAINAGE

PLANNING APPLICATION BOUNDARY

EXISTING GROUND SURFACE

INTERMEDIATE CONTOUR (5 M INTERVAL)

EXISTING GROUND SURFACE

HIGH CONTOUR (1 M INTERVAL)

TURBINE AND SWEEP AREA

TURBINE FOUNDATION

CRANE PLATFORM/HARDSTAND

TEMPORARY ROAD

PROPOSED WF ROAD

FLIGHTING ROAD

ROAD TYPE C (EXCAVATE & REPLACE)

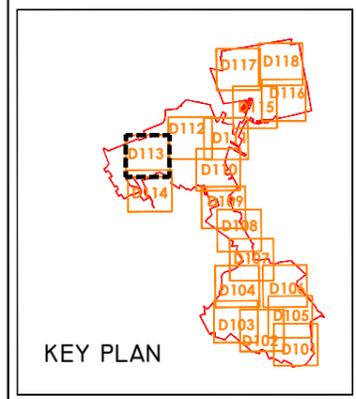
BORROW PIT

SUBSTATION

CONSTRUCTION COMPOUND

MET MAST

PERMANENT CAR PARK



DRAWING NOTES:

- DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
- COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
- DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
- ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044723
© Ordnance Survey Ireland/Government of Ireland

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE	
MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	<ol style="list-style-type: none"> APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE USING SMALL WORKING AREAS WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER
SOURCE CONTROLS	<ol style="list-style-type: none"> USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS, DIVERSION DRAINS, AND CULVERT PIPES EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ul style="list-style-type: none"> A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) SILT FENCES/FILTER FABRICS D) AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS USING SMALL WORKING AREAS SURROUNDING TEMPORARY STOCKPILES CONTAINING SUBSOIL WITH SILT FENCING WEATHERING OFF / SEALING PEAT STOCKPILES
IN-LINE CONTROLS	<ol style="list-style-type: none"> INTERCEPTOR DRAINS, AND/OR COLLECTOR DRAINS/OTE DRAINAGE EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ul style="list-style-type: none"> A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) SILT FENCES/FILTER FABRICS D) CHECK DAMS/WEIRS OR BARRIERS E) AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. IN STREAM SEDIMENTS COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS	<ol style="list-style-type: none"> SILT FENCING TEMPORARY SUMPS/ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. SILT DEWATERING BAGS
OUTFALL CONTROLS	<ol style="list-style-type: none"> LEVEL SPREADERS BUFFERED OUTFALLS VEGETATION FILTERS SILT DEWATERING BAGS FLOW LIMITERS AND WEIRS

Date	Description	Chkd	Signed

Revisions

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
Dungarvan
Co. Waterford
Ireland

tel: +353 (0) 58-44122
tel: +353 (0) 58-44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: **BORD NA MONA POWERGEN LTD**

Job: **BALLIVOR WIND FARM, CO. WESTMEATH/MEATH**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D113**

Drawing No: **P1510-0-0323-A1-D113-00A**

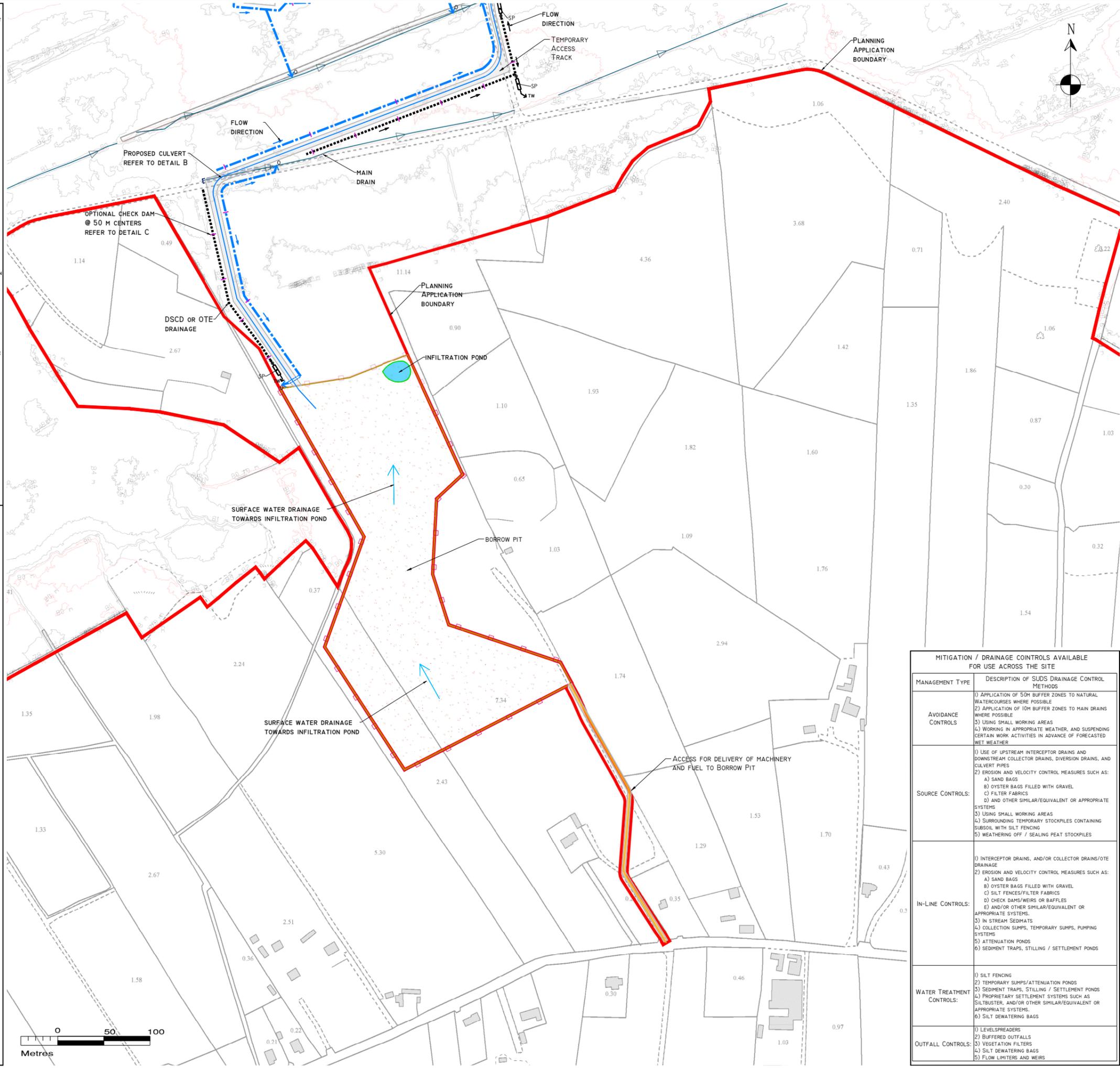
Sheet Size: **A1** Project No.: **P1510-0**
Scale: **1:2,000 (A1)** Drawn By: **GD**
Date: **27/03/2023** Checked By: **MG**

POLLUTION PREVENTION NOTES:

- SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
 - SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
 - SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.
- DISCHARGES**
- WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
 - NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
 - PUMPED WATER WILL BE DIRECTED INTO COLLECTOR DRAINS AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
 - PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND/OR OTHER SIMILAR DISCHARGE CONTROLS.
 - VEGETATION (WHERE PRESENT) WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.
- EXCAVATIONS**
- WHERE DEEP EXCAVATIONS (>2.5M) ARE PROPOSED, CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.
- EXPOSED GROUND & STOCKPILES**
- DURING THE CONSTRUCTION PHASE, THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.
- SITE TRACKS**
- USE OF TRACK SIDE COLLECTOR DRAINS WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
 - WHERE USED, CHECK DAMS ARE TO BE INSPECTED AND CLEANED REGULARLY.
- REFUELLING**
- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / MAIN DRAINS AND OUTSIDE OF WATERCOURSE BUFFERS.
 - SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.
- CONCRETE**
- CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
 - CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE. TEMPORARY CONCRETE WASH OUT AREA WILL BE PROVIDED WHERE DEEMED NECESSARY FOR LARGER POURS
- IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:**
- STOP** - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.
- CONTAIN** - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. MAIN DRAINS AND OUTFALL ROUTES TO NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.
- NOTIFY** - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

- ACCESS TRACK SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SPARE SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, CHECK DAMS / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. WHERE REQUIRED, MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE.
- SUDS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/ OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO MAIN DRAINS AND DRAINAGE ROUTES TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR DRAINS TO BE USED TO COLLECT AND REDISTRIBUTE UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS. WHERE REQUIRED, CROSS DRAINS ARE TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN LOW POINTS. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
- WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK DRAINS.
- BATTERS OF ALL PROPOSED DRAINS TO HAVE A SLOPE OF BETWEEN 1:1.5 TO 1:2 DEPENDING UPON DEPTH OF DRAIN AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE DRAINS BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT EROSION/SCOUR. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
- WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING D501.
- SILT FENCES OR SIMILAR, TO BE USED ALSO AROUND SUBSOIL SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING MAIN DRAINS / WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY MAIN DRAIN / EPHEMERAL CHANNELS.
- SLOPES OF THE DRAINS TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (PEAT 'SOO' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY FOR REUSE DURING LANDSCAPING OF STOCKPILES.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
- BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE DRAIN.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
- OILS/FUELS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.



DRAWING LEGEND:

- RIVERS/STREAMS
- RIVERS/STREAMS 50M BUFFER
- STREAM FLOW DIRECTION
- DRAINS
- EXISTING MAIN DRAINS
- REDIRECTED MAIN DRAINS
- EXISTING PAVED DRAINS
- EXISTING 6M² SETTLEMENT PONDS
- UPSTREAM INTERCEPTOR DRAIN
- DOWNSTREAM COLLECTOR DRAIN (DSCD)
- DSCD OR OTE ON THE EDGE (OTE)
- INDICATIVE DIRECTION OF FLOW
- SILT FENCES
- WF SETTLEMENT POND
- LEVEL SPREADER
- OPTIONAL CHECK DAM 'TYPE A'
- CHECK DAM 'TYPE B'
- PROPOSED CULVERTS/BRIDGES
- INTERCEPTOR DRAIN CULVERT
- COLLECTOR DRAIN CULVERT
- OVERLAND FLOW DISCHARGE
- TURBINE WATER DISCHARGE
- WF SETTLEMENT POND

KEY PLAN:

The key plan shows a larger site area with several numbered blocks (D101 to D118). A red box highlights the area covered by this drawing (D114).

KEY PLAN

DRAWING NOTES:

- DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
- COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
- DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
- ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044723
© Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed

Revisions

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
Dungarvan
Co. Waterford
Ireland

tel: +353 (0) 58-44122
tel: +353 (0) 58-44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: **BORD NA MONA POWERGEN LTD**

Job: **BALLIVOR WIND FARM, Co. WESTMEATH/MEATH**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D114**

Drawing No: **P1510-0-0323-A1-D114-00A**

Sheet Size: **A1** Project No.: **P1510-0**

Scale: **1:2,000 (A1)** Drawn By: **GD**

Date: **27/03/2023** Checked By: **MG**

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE

MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	<ol style="list-style-type: none"> APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE USING SMALL WORKING AREAS WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER
SOURCE CONTROLS	<ol style="list-style-type: none"> USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS, DIVERSION DRAINS, AND CULVERT PIPES EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL FILTER FABRICS AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS USING SMALL WORKING AREAS SURROUNDING TEMPORARY STOCKPILES CONTAINING SUBSOIL WITH SILT FENCING WEATHERING OFF / SEALING PEAT STOCKPILES
IN-LINE CONTROLS	<ol style="list-style-type: none"> INTERCEPTOR DRAINS, AND/OR COLLECTOR DRAINS/OTE DRAINAGE EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL SILT FENCES/FILTER FABRICS CHECK DAMS/WEIRS OR BAFFLES AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. IN STREAM SEDIMENTS COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS	<ol style="list-style-type: none"> SILT FENCING TEMPORARY SUMPS/ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. SILT DEWATERING BAGS
OUTFALL CONTROLS	<ol style="list-style-type: none"> LEVELSPREADERS BUFFERED OUTFALLS VEGETATION FILTERS SILT DEWATERING BAGS FLOW LIMITERS AND WEIRS

POLLUTION PREVENTION NOTES:

- SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
- SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
- SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.
- DISCHARGES**
 4. WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
 5. NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
 6. PUMPED WATER WILL BE DIRECTED INTO COLLECTOR DRAINS AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
 7. PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND/OR OTHER SIMILAR DISCHARGE CONTROLS.
 8. VEGETATION (WHERE PRESENT) WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.
- EXCAVATIONS**
 9. WHERE DEEP EXCAVATIONS (>2.5M) ARE PROPOSED, CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.
- EXPOSED GROUND & STOCKPILES**
 10. DURING THE CONSTRUCTION PHASE, THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.
- SITE TRACKS**
 11. USE OF TRACK SIDE COLLECTOR DRAINS WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
 12. WHERE USED, CHECK DAMS ARE TO BE INSPECTED AND CLEANED REGULARLY.
- REFUELLING**
 13. REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / MAIN DRAINS AND OUTSIDE OF WATERCOURSE BUFFERS.
 14. SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.
- CONCRETE**
 15. CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
 16. CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE. TEMPORARY CONCRETE WASH OUT AREA WILL BE PROVIDED WHERE DEEMED NECESSARY FOR LARGER POURS.

IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:

STOP - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

CONTAIN - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. MAIN DRAINS AND OUTFALL ROUTES TO NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.

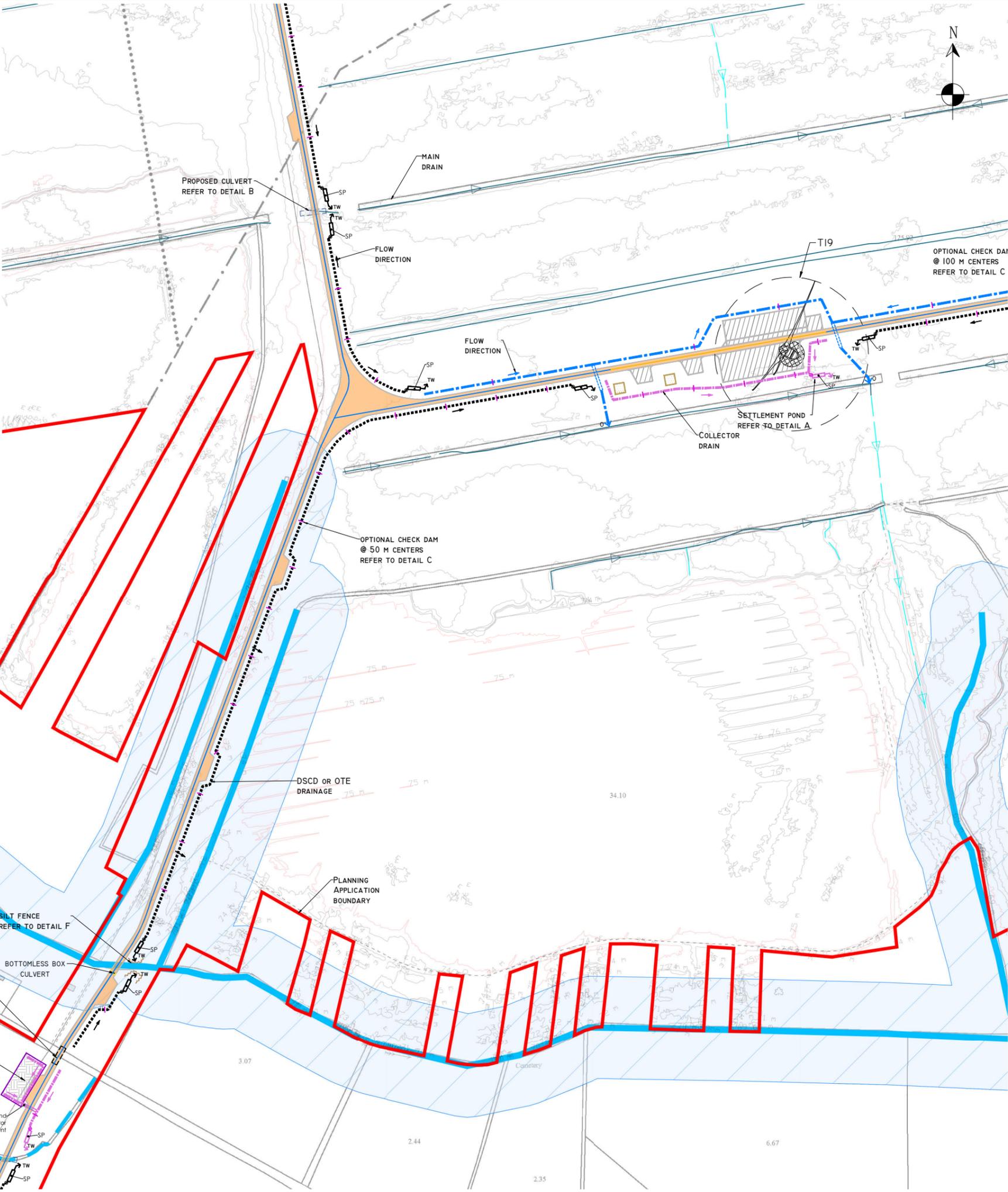
NOTIFY - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

- ACCESS TRACK SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SPARE SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, CHECK DAMS / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS, WHERE REQUIRED, MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE.
- SUDS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO MAIN DRAINS AND DRAINAGE ROUTES TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR DRAINS TO BE USED TO COLLECT AND REDISTRIBUTE UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS. WHERE REQUIRED, CROSS DRAINS ARE TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN LOW POINTS. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
- WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK DRAINS.
- BATTERS OF ALL PROPOSED DRAINS TO HAVE A SLOPE OF BETWEEN 1 : 1.5 TO 1 : 2 DEPENDING UPON DEPTH OF DRAIN AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE DRAINS TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT EROSION/SCOUR. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
- WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING D501.
- SILT FENCES OR SIMILAR, TO BE USED ALSO AROUND SUBSOIL SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING MAIN DRAINS / WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY MAIN DRAIN / EPHEMERAL CHANNELS.
- SLOPES OF THE DRAINS TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (PEAT 'SOO' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY FOR REUSE DURING LANDSCAPING OF STOCKPILES.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20 - 40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
- BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE DRAIN.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE ENDURANCEMENT AROUND THE POND.
- OILS/FUELS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE

MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	1) APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE 2) APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE 3) USING SMALL WORKING AREAS 4) WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER
SOURCE CONTROLS	1) USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS, DIVERSION DRAINS, AND CULVERT PIPES 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) FILTER FABRICS D) AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 3) USING SMALL WORKING AREAS 4) SURROUNDING TEMPORARY STOCKPILES CONTAINING SUBSOIL WITH SILT FENCING 5) WEATHERING OFF / SEALING PEAT STOCKPILES
IN-LINE CONTROLS	1) INTERCEPTOR DRAINS, AND/OR COLLECTOR DRAINS/OTE DRAINAGE 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) SILT FENCES/FILTER FABRICS D) CHECK DAMS/WEIRS OR BAFFLES E) AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. 3) IN STREAM SEDIMENTS 4) COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS 5) ATTENUATION PONDS 6) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS	1) SILT FENCING 2) TEMPORARY SUMPS/ATTENUATION PONDS 3) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS 4) PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. 5) SILT DEWATERING BAGS
OUTFALL CONTROLS	1) LEVELSPREADERS 2) BUFFERED OUTFALLS 3) VEGETATION FILTERS 4) SILT DEWATERING BAGS 5) FLOW LIMITERS AND WEIRS

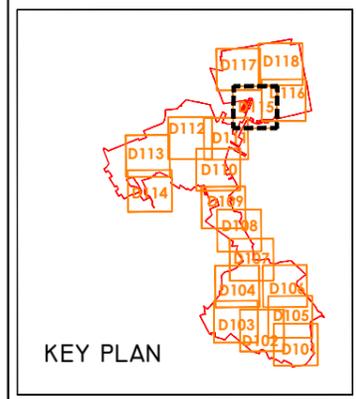


DRAWING LEGEND:

- RIVERS/STREAMS
- RIVERS/STREAMS 50M BUFFER
- STREAM FLOW DIRECTION
- EXISTING MAIN DRAINS
- REDESIGNED MAIN DRAINS
- EXISTING PAVED DRAINS
- EXISTING BM SETTLEMENT PONDS
- UPSTREAM INTERCEPTOR DRAIN
- DOWNSTREAM COLLECTOR DRAIN (DSCD)
- DSCD OR OTE ON OVER THE EDGE (OTE)
- INDICATIVE DIRECTION OF FLOW
- SILT FENCES
- WF SETTLEMENT POND
- LEVEL SPREADER
- OPTIONAL CHECK DAM TYPE A
- CHECK DAM TYPE B
- PROPOSED CULVERTS/BRIDGES
- INTERCEPTOR DRAIN CULVERT
- COLLECTOR DRAIN CULVERT
- OVERLAND FLOW DISCHARGE
- TREATED WATER DISCHARGE
- WF SETTLEMENT POND

EXISTING DRAINAGE

- PLANNING APPLICATION BOUNDARY
- EXISTING GROUND SURFACE
- INTERMEDIATE CONTOUR (5 M INTERVAL)
- EXISTING GROUND SURFACE
- HIGH CONTOUR (1 M INTERVAL)
- TURBINE AND SWEEP AREA
- TURBINE FOUNDATION
- CRANE PLATFORM/HARDSTAND
- TEMPORARY ROAD
- PROPOSED WF ROAD
- FLOATING ROAD
- ROAD TYPE C (EXCAVATE & REPLACE)
- BORROW PIT
- SUBSTATION
- CONSTRUCTION COMPOUND
- HET MAST
- PERMANENT CAR PARK



DRAWING NOTES:

- DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
- COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
- DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
- ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044723
 © Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed

Revisions

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
 Dunganan
 Co. Waterford
 Ireland

tel: +353 (0) 58-44122
 tel: +353 (0) 58-44244
 email: info@hydroenvironmental.ie
 web: www.hydroenvironmental.ie

Client: **BORD NA MONA POWERGEN LTD**

Job: **BALLIVOR WIND FARM, CO. WESTMEATH/MEATH**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D115**

Drawing No: **P1510-0-0323-A1-D115-00A**

Sheet Size: **A1** Project No.: **P1510-0**

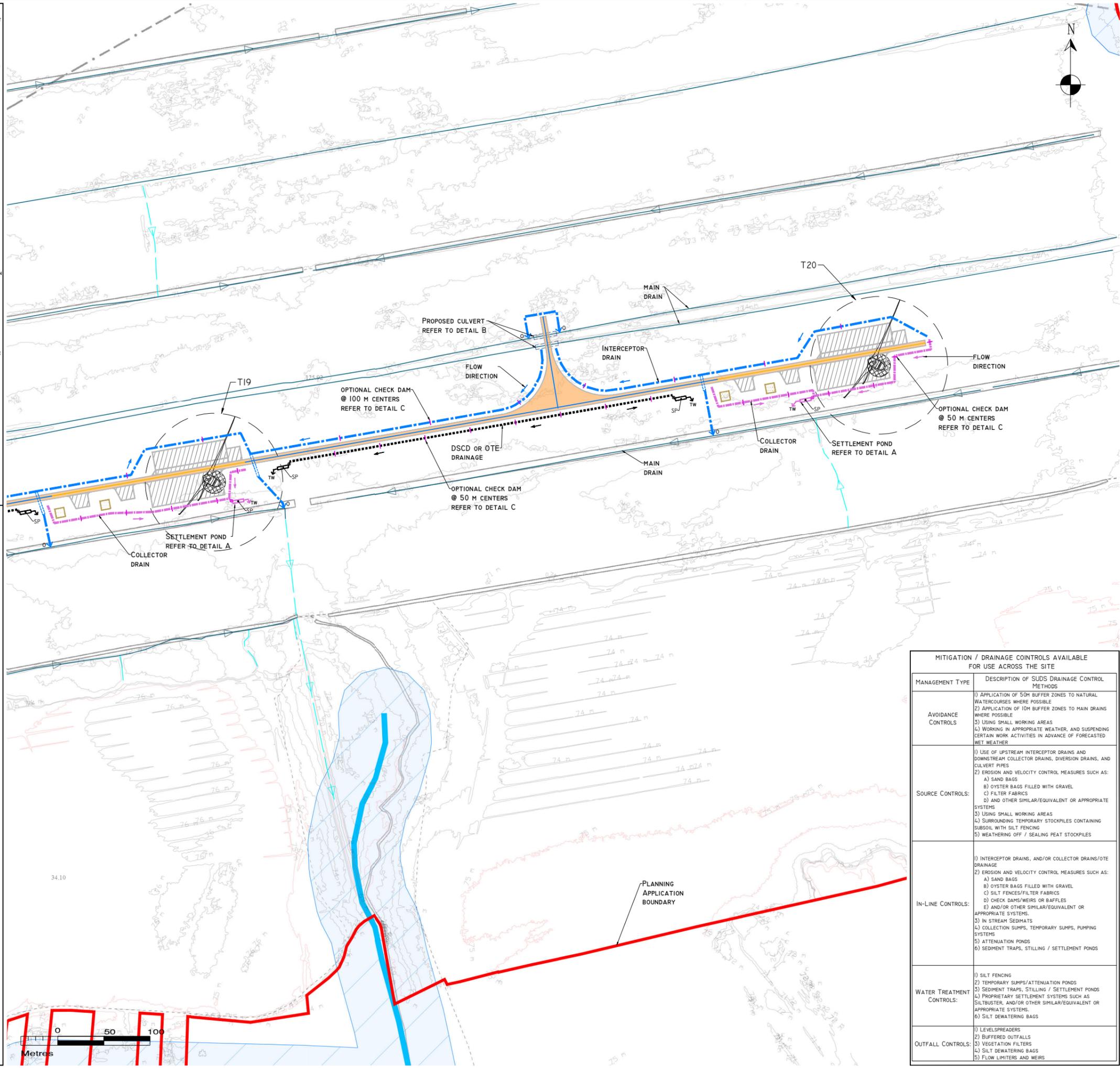
Scale: **1:2,000 (A1)** Drawn By: **GD**
 Date: **27/03/2023** Checked By: **MG**

POLLUTION PREVENTION NOTES:

- SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
 - SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
 - SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.
- Discharges**
- WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
 - NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
 - PUMPED WATER WILL BE DIRECTED INTO COLLECTOR DRAINS AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
 - PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND/OR OTHER SIMILAR DISCHARGE CONTROLS.
 - VEGETATION (WHERE PRESENT) WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.
- Excavations**
- WHERE DEEP EXCAVATIONS (>2.5M) ARE PROPOSED, CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.
- Exposed Ground & Stockpiles**
- DURING THE CONSTRUCTION PHASE, THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.
- Site Tracks**
- USE OF TRACK SIDE COLLECTOR DRAINS WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
 - WHERE USED, CHECK DAMS ARE TO BE INSPECTED AND CLEANED REGULARLY.
- Refuelling**
- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / MAIN DRAINS AND OUTSIDE OF WATERCOURSE BUFFERS.
 - SPLIT KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.
- Concrete**
- CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
 - CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE. TEMPORARY CONCRETE WASH OUT AREA WILL BE PROVIDED WHERE DEEMED NECESSARY FOR LARGER POURS
- IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:**
- STOP** - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.
- CONTAIN** - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. MAIN DRAINS AND OUTFALL ROUTES TO NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.
- NOTIFY** - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

- ACCESS TRACK SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SPARE SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, CHECK DAMS / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS, WHERE REQUIRED, MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE.
- SLDS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO MAIN DRAINS AND DRAINAGE ROUTES TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR DRAINS TO BE USED TO COLLECT AND REDISTRIBUTE UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
- WHERE REQUIRED, CROSS DRAINS ARE TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN LOW POINTS. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
- WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK DRAINS.
- BATTERS OF ALL PROPOSED DRAINS TO HAVE A SLOPE OF BETWEEN 1:1.5 TO 1:2 DEPENDING UPON DEPTH OF DRAIN AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE DRAINS TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT EROSION/SCOUR. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
- WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING DSOI.
- SILT FENCES OR SIMILAR, TO BE USED ALSO AROUND SUBSOIL SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING MAIN DRAINS / WATERCOURSE WHERE WORKS COMES WITHIN 415M OF EDGE OF ANY MAIN DRAIN / EPHEMERAL CHANNELS.
- SLOPES OF THE DRAINS TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER ('SOIL' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY FOR REUSE DURING LANDSCAPING OF STOCKPILES.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
- BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE DRAIN.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
- OILS/FUELS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.



DRAWING LEGEND:

- RIVERS/STREAMS 50M BUFFER
- STREAM FLOW DIRECTION
- EXISTING MAIN DRAINS
- REDIRECTED MAIN DRAINS
- EXISTING PIPED DRAINS
- EXISTING 6MM SETTLEMENT PONDS
- UPSTREAM INTERCEPTOR DRAIN
- DOWNSTREAM COLLECTOR DRAIN (DSCD)
- DSCD OR OTE ON THE EDGE (OTE)
- INDICATIVE DIRECTION OF FLOW
- SILT FENCES
- WF SETTLEMENT POND
- LEVEL SPREADER
- OPTIONAL CHECK DAM 'TYPE A'
- CHECK DAM 'TYPE B'
- PROPOSED CULVERTS/BRIDGES
- INTERCEPTOR DRAIN CULVERT
- COLLECTOR DRAIN CULVERT
- OVERLAND FLOW DISCHARGE
- TW TREATED WATER DISCHARGE
- SP WF SETTLEMENT POND

KEY PLAN:

KEY PLAN

DRAWING NOTES:

- DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
- COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
- DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
- ALL DIMENSIONS ARE IN METRES.

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE	
MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	<ol style="list-style-type: none"> APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE USING SMALL WORKING AREAS WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER
SOURCE CONTROLS	<ol style="list-style-type: none"> USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS, DIVERSION DRAINS, AND CULVERT PIPES EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL FILTER FABRICS AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS USING SMALL WORKING AREAS SURROUNDING TEMPORARY STOCKPILES CONTAINING SUBSOIL WITH SILT FENCING WEATHERING OFF / SEALING FEAT STOCKPILES
IN-LINE CONTROLS	<ol style="list-style-type: none"> INTERCEPTOR DRAINS, AND/OR COLLECTOR DRAINS/OTE DRAINAGE EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL FILTER FABRICS CHECK DAMS/WEIRS OR BAFFLES AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. IN STREAM SEDIMENTS COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS	<ol style="list-style-type: none"> SILT FENCING TEMPORARY SUMPS/ATTENUATION PONDS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. SILT DEWATERING BAGS
OUTFALL CONTROLS	<ol style="list-style-type: none"> LEVEL SPREADERS BUFFERED OUTFALLS VEGETATION FILTERS SILT DEWATERING BAGS FLOW LIMITERS AND WEIRS

Ordnance Survey Ireland Licence No. EN 0044723
© Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
Dungarvan
Co. Waterford
Ireland

tel: +353 (0) 58-44122
tel: +353 (0) 58-44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: **BORD NA MONA POWERGEN LTD**

Job: **BALLIVOR WIND FARM, CO. WESTMEATH/MEATH**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D116**

Drawing No: **P1510-0-0323-A1-D116-00A**

Sheet Size: **A1** Project No.: **P1510-0**

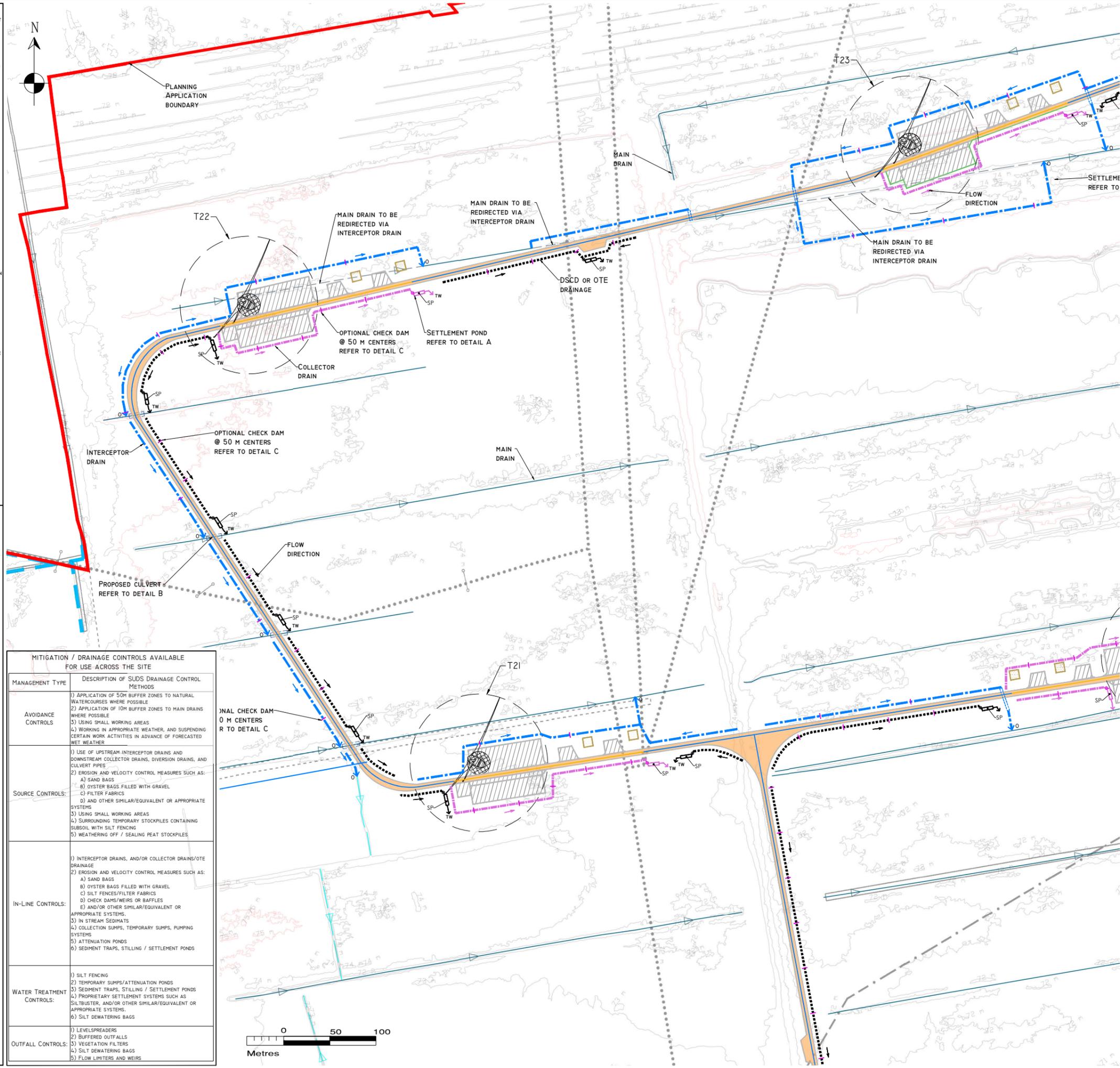
Scale: **1:2,000 (A1)** Drawn By: **GD**
Date: **27/03/2023** Checked By: **MG**

POLLUTION PREVENTION NOTES:

- SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
 - SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
 - SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.
- DISCHARGES**
- WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
 - NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
 - PUMPED WATER WILL BE DIRECTED INTO COLLECTOR DRAINS AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
 - PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND/OR OTHER SIMILAR DISCHARGE CONTROLS.
 - VEGETATION (WHERE PRESENT) WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.
- EXCAVATIONS**
- WHERE DEEP EXCAVATIONS (>2.5M) ARE PROPOSED, CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.
- EXPOSED GROUND & STOCKPILES**
- DURING THE CONSTRUCTION PHASE, THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.
- SITE TRACKS**
- USE OF TRACK SIDE COLLECTOR DRAINS WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
 - WHERE USED, CHECK DAMS ARE TO BE INSPECTED AND CLEANED REGULARLY.
- REFUELLING**
- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / MAIN DRAINS AND OUTSIDE OF WATERCOURSE BUFFERS.
 - SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.
- CONCRETE**
- CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
 - CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE. TEMPORARY CONCRETE WASH OUT AREA WILL BE PROVIDED WHERE DEEMED NECESSARY FOR LARGER POURS.
- IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:**
- STOP** - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.
- CONTAIN** - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. MAIN DRAINS AND OUTFALL ROUTES TO NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.
- NOTIFY** - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

- ACCESS TRACK SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SPARE SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, CHECK DAMS / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. WHERE REQUIRED, MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE.
- SLODS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/ OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO MAIN DRAINS AND DRAINAGE ROUTES TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR DRAINS TO BE USED TO COLLECT AND REDISTRIBUTE UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
- WHERE REQUIRED, CROSS DRAINS ARE TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN LOW POINTS. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
- WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK DRAINS.
- BATTERS OF ALL PROPOSED DRAINS TO HAVE A SLOPE OF BETWEEN 1:1.5 TO 1:2 DEPENDING UPON DEPTH OF DRAIN AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE DRAINS TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT EROSION/SCOUR. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
- WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING D501.
- SILT FENCES OR SIMILAR, TO BE USED ALSO AROUND SUBSOIL SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING MAIN DRAINS / WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY MAIN DRAIN / EPHEMERAL CHANNELS.
- SLOPES OF THE DRAINS TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER ('PEAT' 'SOIL' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY FOR REUSE DURING LANDSCAPING OF STOCKPILES.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
- BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSAL OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE DRAIN.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
- OILS/FUELS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.



MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE	
MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	1) APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE 2) APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE 3) USING SMALL WORKING AREAS 4) WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER
SOURCE CONTROLS	1) USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS, DIVERSION DRAINS, AND CULVERT PIPES 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) SILT FENCES/FILTER FABRICS D) AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 3) USING SMALL WORKING AREAS 4) SURROUNDING TEMPORARY STOCKPILES CONTAINING SUBSOIL WITH SILT FENCING 5) WEATHERING OFF / SEALING FEAT STOCKPILES
IN-LINE CONTROLS	1) INTERCEPTOR DRAINS, AND/OR COLLECTOR DRAINS/OTE DRAINAGE 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) SILT FENCES/FILTER FABRICS D) CHECK DAMS/WEIRS OR BAFFLES E) AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. 3) IN STREAM SEDIMENTS 4) COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS 5) ATTENUATION PONDS 6) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS	1) SILT FENCING 2) TEMPORARY SUMPS/ATTENUATION PONDS 3) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS 4) PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. 5) SILT DEWATERING BAGS
OUTFALL CONTROLS	1) LEVELSPREADERS 2) BUFFERED OUTFALLS 3) VEGETATION FILTERS 4) SILT DEWATERING BAGS 5) FLOW LIMITERS AND WEIRS

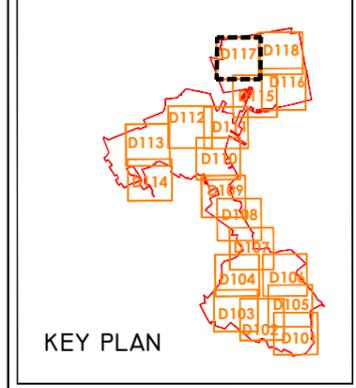


DRAWING LEGEND:

- RIVERS/STREAMS
- RIVERS/STREAMS 50M BUFFER
- STREAM FLOW DIRECTION
- DRAINS
- EXISTING MAIN DRAINS
- REDIRECTED MAIN DRAINS
- EXISTING PAVED DRAINS
- EXISTING 6M SETTLEMENT PONDS
- UPSTREAM INTERCEPTOR DRAIN
- DOWNSTREAM COLLECTOR DRAIN (DSCD)
- DSCD OR OTE (OTE)
- NEGATIVE DIRECTION OF FLOW
- SILT FENCES
- WF SETTLEMENT POND
- LEVEL SPREADER
- OPTIONAL CHECK DAM 'TYPE A'
- CHECK DAM 'TYPE B'
- PROPOSED CULVERTS/BRIDGES
- INTERCEPTOR DRAIN CULVERT
- COLLECTOR DRAIN CULVERT
- OVERLAND FLOW DISCHARGE
- TW TREATED WATER DISCHARGE
- SP WF SETTLEMENT POND

EXISTING DRAINAGE

- PLANNING APPLICATION BOUNDARY
- EXISTING GROUND SURFACE INTERMEDIATE CONTOUR (5 M INTERVAL)
- EXISTING GROUND SURFACE MINOR CONTOUR (1 M INTERVAL)
- TURBINE AND SWEEP AREA
- TURBINE FOUNDATION
- CRANE PLATFORM/HARDSTAND
- TEMPORARY ROAD
- PROPOSED WF ROAD
- FLOATING ROAD
- ROAD TYPE C (EXCAVATE & REPLACE)
- BORROW PIT
- SUBSTATION
- CONSTRUCTION COMPOUND
- HET HAST
- PERMANENT CAR PARK



DRAWING NOTES

- DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
- COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
- DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
- ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044723
 © Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed

Revisions

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
 Dunganavan
 Co. Waterford
 Ireland

tel: +353 (0) 58-44122
 tel: +353 (0) 58-44244
 email: info@hydroenvironmental.ie
 web: www.hydroenvironmental.ie

Client: **BORD NA MONA POWERGEN LTD**

Job: **BALLIVOR WIND FARM, CO. WESTMEATH/MEATH**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D117**

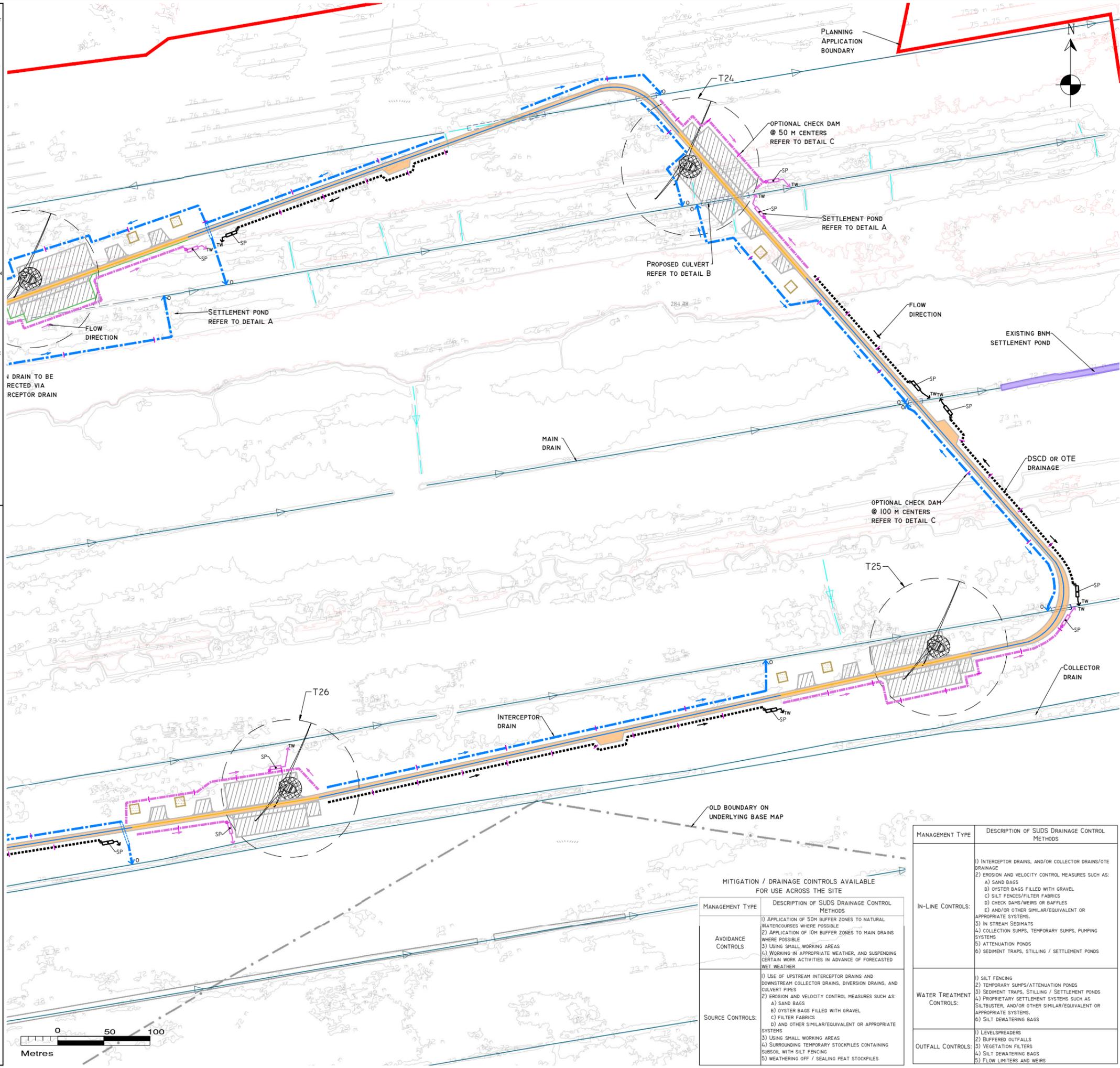
Drawing No: P1510-0-0323-A1-D117-00A
 Sheet Size: A1 Project No.: P1510-0
 Scale: 1:2,000 (A1) Drawn By: GD
 Date: 27/03/2023 Checked By: MG

POLLUTION PREVENTION NOTES:

- SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
 - SUITABLE DRAINAGE CONTROL MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO OFF SITE RECEIVING WATERCOURSES.
 - SILTY WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROADS/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.
- DISCHARGES**
- WATER CONTAINING SILT WILL NOT BE PUMPED DIRECTLY TO ANY NATURAL WATERCOURSE. ALL DISCHARGES TO BE MADE OVER OPEN GROUND OR INTO EXISTING FIELD DRAIN WITH SILT TRAP AT A MINIMUM OF 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
 - NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
 - PUMPED WATER WILL BE DIRECTED INTO COLLECTOR DRAINS AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
 - PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND/OR OTHER SIMILAR DISCHARGE CONTROLS.
 - VEGETATION (WHERE PRESENT) WILL NOT BE STRIPPED FROM EXISTING DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.
- EXCAVATIONS**
- WHERE DEEP EXCAVATIONS (>2.5M) ARE PROPOSED, CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE THE CASE AROUND TURBINE BASE EXCAVATIONS.
- EXPOSED GROUND & STOCKPILES**
- DURING THE CONSTRUCTION PHASE, THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.
- SITE TRACKS**
- USE OF TRACK SIDE COLLECTOR DRAINS WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
 - WHERE USED, CHECK DAMS ARE TO BE INSPECTED AND CLEANED REGULARLY.
- REFUELLING**
- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / MAIN DRAINS AND OUTSIDE OF WATERCOURSE BUFFERS.
 - SPILL KITS AND DRIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.
- CONCRETE**
- CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
 - CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE. TEMPORARY CONCRETE WASH OUT AREA WILL BE PROVIDED WHERE DEEMED NECESSARY FOR LARGER POURS.
- IF WATER POLLUTION IS IDENTIFIED THE FOLLOWING STEPS WOULD BE ADHERED TO:**
- STOP** - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.
- CONTAIN** - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. MAIN DRAINS AND OUTFALL ROUTES TO NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.
- NOTIFY** - THE RELEVANT AUTHORITIES (SITE MANAGER / FISHERIES / NPWS / LOCAL AUTHORITY ETC.) SHOULD BE NOTIFIED IMMEDIATELY TO ENSURE THAT MEASURES CAN BE IMPLEMENTED DOWNSTREAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

DRAINAGE NOTES:

- ACCESS TRACK SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SPARE SILT FENCING/ OR SIMILAR, TO BE STORED ON SITE. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES, CHECK DAMS / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEMAS. WHERE REQUIRED, MOBILE SILTBUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE.
- SLODS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIED OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
- SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO MAIN DRAINS AND DRAINAGE ROUTES TO RECEIVING WATERCOURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR DRAINS TO BE USED TO COLLECT AND REDISTRIBUTE UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DRAINS WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
- WHERE REQUIRED, CROSS DRAINS ARE TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN LOW POINTS. LOCATIONS OF CROSS DRAINS TO BE AGREED WITH THE ENGINEER ON SITE. SURFACE WATER WILL NOT BE ALLOWED TO DISCHARGE DIRECTLY INTO EXISTING WATERCOURSES.
- WHERE POSSIBLE, A BUFFER ZONE OF >20M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK DRAINS.
- BATTERS OF ALL PROPOSED DRAINS TO HAVE A SLOPE OF BETWEEN 1:1.5 TO 1:2 DEPENDING UPON DEPTH OF DRAIN AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE DRAINS TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT EROSION/SCOUR. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAINMENT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
- WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING DSOI.
- SILT FENCES OR SIMILAR, TO BE USED ALSO AROUND SUBSOIL SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING MAIN DRAINS / WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY MAIN DRAIN / EPHEMERAL CHANNELS.
- SLOPES OF THE DRAINS TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (PEAT 'SOO' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY FOR REUSE DURING LANDSCAPING OF STOCKPILES.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY WON / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-40MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, 40MM CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100M STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
- BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF THE DRAIN.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. WIND FARM SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHERE THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE TURBINE BASE AND HARDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
- OILS/FUELS SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.



DRAWING LEGEND:

- RIVERS/STREAMS
- RIVERS/STREAMS 50M BUFFER
- STREAM FLOW DIRECTION
- DRAINS
- EXISTING MAIN DRAINS
- REDIRECTED MAIN DRAINS
- EXISTING PAVED DRAINS
- EXISTING BNM SETTLEMENT PONDS
- UPSTREAM INTERCEPTOR DRAIN
- DOWNSTREAM COLLECTOR DRAIN (DSCD)
- DSCD OR OTE OVER THE EDGE (OTE)
- INDICATIVE DIRECTION OF FLOW
- SILT FENCES
- WF SETTLEMENT POND
- LEVEL SPREADER
- OPTIONAL CHECK DAM 'TYPE A'
- CHECK DAM 'TYPE B'
- PROPOSED CULVERTS/BRIDGES
- INTERCEPTOR DRAIN CULVERT
- COLLECTOR DRAIN CULVERT
- OVERLAND FLOW DISCHARGE
- TURBINE WASH DISCHARGE
- WF SETTLEMENT POND

EXISTING DRAINAGE

- PLANNING APPLICATION BOUNDARY
- EXISTING GROUND SURFACE
- INTERMEDIATE CONTOUR (5 M INTERVAL)
- EXISTING GROUND SURFACE
- MINOR CONTOUR (1 M INTERVAL)
- TURBINE AND SWEEP AREA
- TURBINE FOUNDATION
- CRANE PLATFORM/HARDSTAND
- TEMPORARY ROAD
- PROPOSED WF ROAD
- FLLOATING ROAD
- ROAD TYPE C (EXCAVATE & REPLACE)
- BORROW PIT
- SUBSTATION
- CONSTRUCTION COMPOUND
- HET HAST
- PERMANENT CAR PARK



DRAWING NOTES:

- DRAWINGS ISSUED ARE FOR PLANNING APPLICATION PURPOSES ONLY.
- COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
- DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
- ALL DIMENSIONS ARE IN METRES.

Ordnance Survey Ireland Licence No. EN 0044723
© Ordnance Survey Ireland/Government of Ireland

Date	Description	Chkd	Signed

Revisions

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
Dungarvan
Co. Waterford
Ireland

tel: +353 (0) 58-44122
tel: +353 (0) 58-44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: **BORD NA MONA POWERGEN LTD**

Job: **BALLIVOR WIND FARM, CO. WESTMEATH/MEATH**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **D118**

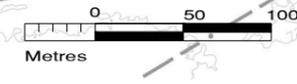
Drawing No: **P1510-0-0323-A1-D118-00A**

Sheet Size: **A1** Project No.: **P1510-0**
Scale: **1:2,000 (A1)** Drawn By: **GD**
Date: **27/03/2023** Checked By: **MG**

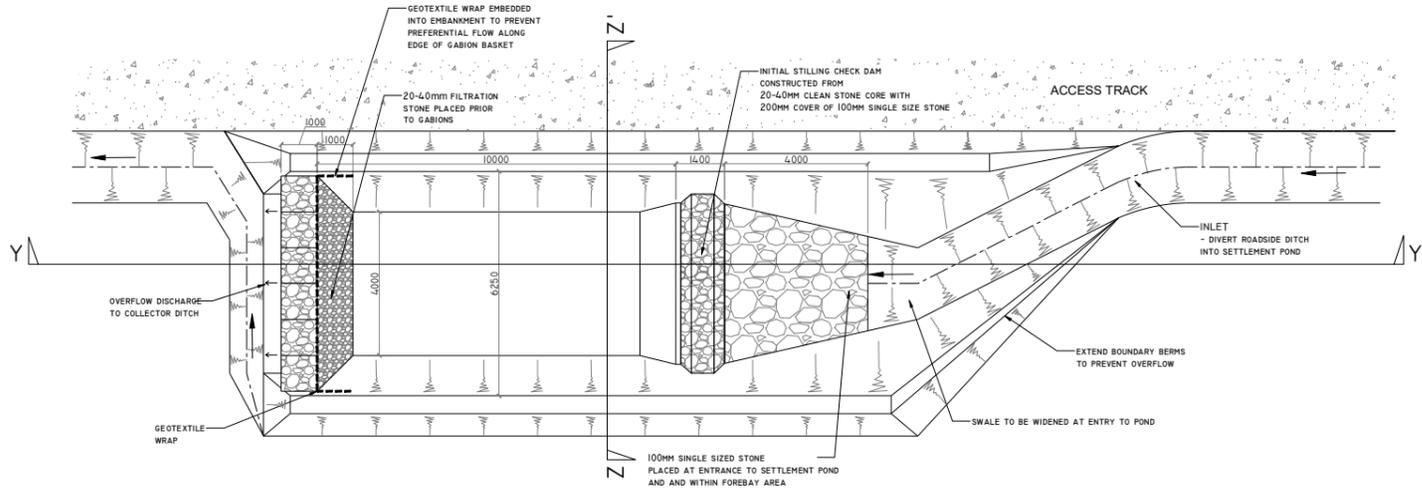
MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE

MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
AVOIDANCE CONTROLS	1) APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE 2) APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE 3) USING SMALL WORKING AREAS 4) WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHER
SOURCE CONTROLS	1) USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS, DIVERSION DRAINS, AND CULVERT PIPES 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) FILTER FABRICS D) AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 3) USING SMALL WORKING AREAS 4) SURROUNDING TEMPORARY STOCKPILES CONTAINING SUBSOIL WITH SILT FENCING 5) WEATHERING OFF / SEALING PEAT STOCKPILES

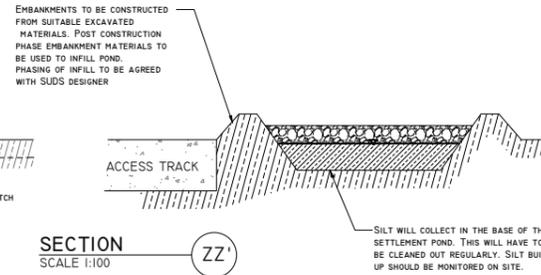
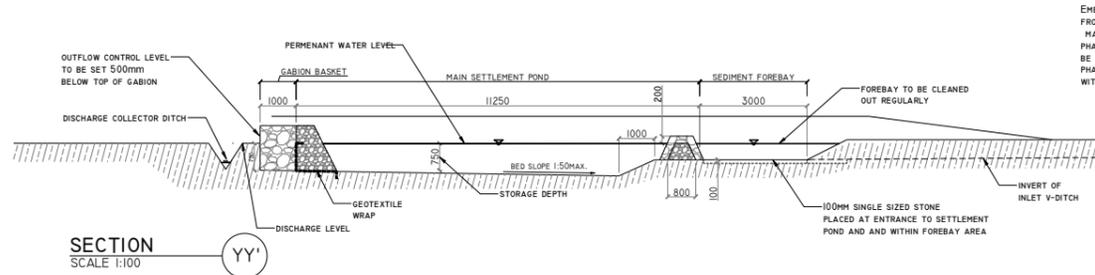
MANAGEMENT TYPE	DESCRIPTION OF SUDS DRAINAGE CONTROL METHODS
IN-LINE CONTROLS:	1) INTERCEPTOR DRAINS, AND/OR COLLECTOR DRAINS/OTE DRAINS 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) SILT FENCES/FILTER FABRICS D) CHECK DAMS/WEIRS OR BAFFLES 3) AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 4) COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS 5) ATTENUATION PONDS 6) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS:	1) SILT FENCING 2) TEMPORARY SUMPS/ATTENUATION PONDS 3) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS 4) PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. 5) SILT DEWATERING BAGS
OUTFALL CONTROLS:	1) LEVEL SPREADERS 2) BUFFERED OUTFALLS 3) VEGETATION FILTERS 4) SILT DEWATERING BAGS 5) FLOW LIMITERS AND WEIRS



DETAIL A

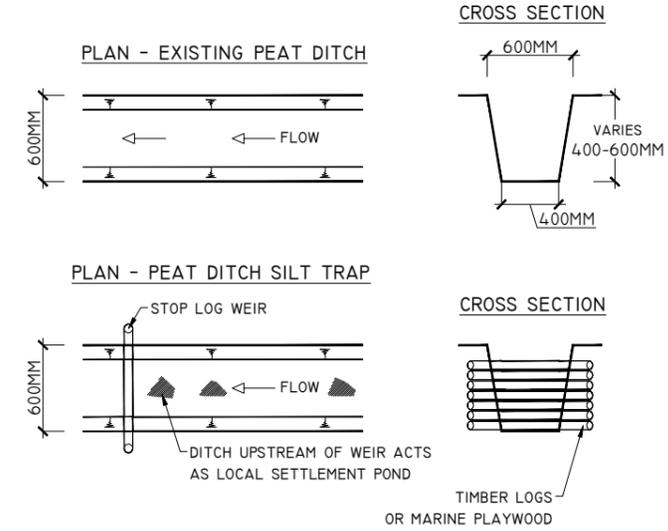


TYPICAL ROAD SIDE SETTLEMENT POND DETAIL
SCALE 1:200 (NOTE DIMENSIONS VARY DEPENDING ON CATCHMENT SIZE)



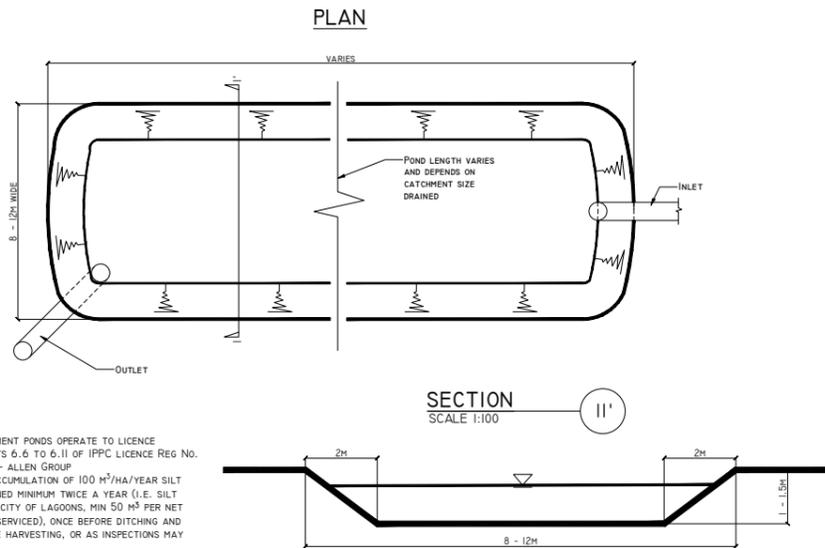
DETAIL B

PEAT DITCH SILT TRAP
SCALE 1:25



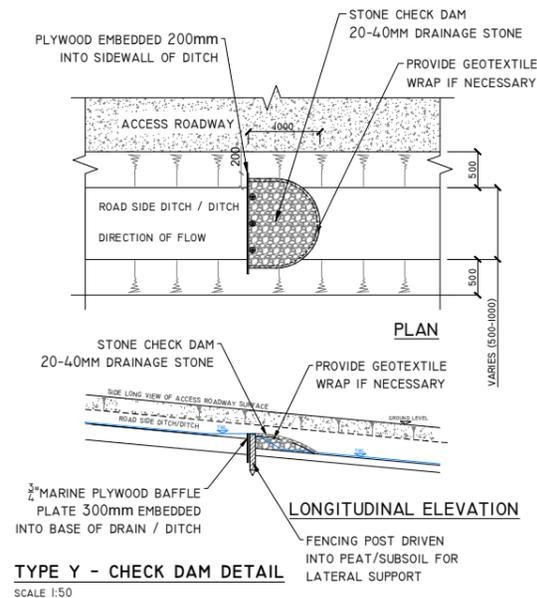
DETAIL C

TYPICAL BNM SETTLEMENT POND DETAIL
SCALE 1:200



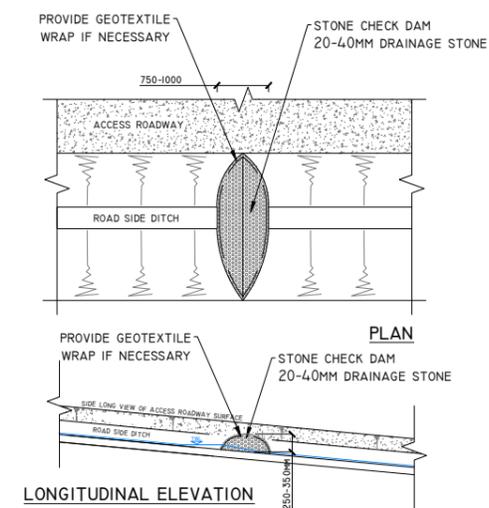
- NOTES:**
- ALL SETTLEMENT PONDS OPERATE TO LICENCE REQUIREMENTS 6.6 TO 6.11 OF IPPC LICENCE REG NO. 505 - BNM - ALLEN GROUP
 - BASED ON ACCUMULATION OF 100 M³/HA/YEAR SILT
 - POND CLEANED MINIMUM TWICE A YEAR (I.E. SILT DESIGN CAPACITY OF LAGOONS, MIN 50 M³ PER NET HA OF BOG SERVICED), ONCE BEFORE DITCHING AND ONCE BEFORE HARVESTING, OR AS INSPECTIONS MAY DICTATE
 - GENERALLY - 8 - 12 M WIDE, AND 1 - 1.5 M DEEP
 - VELOCITY THRESHOLD OF 0.1 M/SEC

DETAIL D



TYPE Y - CHECK DAM DETAIL
SCALE 1:50

DETAIL E



TYPE X - CHECK DAM DETAIL
SCALE 1:50

- PROJECT DESIGN DRAWING NOTES:**
1. PLEASE NOTE THIS DRAWING IS FOR PLANNING PURPOSES ONLY, AND FURTHER DETAILED SPECIFICATION WILL BE REQUIRED FOR THE EXECUTION OF THE WORKS TO ENSURE THEY MEET REQUIRED RELEVANT DESIGN STANDARDS, AND POTENTIAL PLANNING CONDITIONS.
 2. DRAWINGS NOT TO BE USED FOR CONSTRUCTION /CONTRACT CONDITIONS.
 3. COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
 4. DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
 5. THE USE OF OR RELIANCE UPON THIS DRAWING SHALL BE DEEMED TO BE ACCEPTANCE OF THESE CONDITIONS OF USE UNLESS OTHERWISE AGREED IN WRITING. SUCH WRITTEN AGREEMENT TO BE SOUGHT FROM AND ISSUED BY THE COPYRIGHT HOLDER TO THE USE OR RELIANCE UPON THIS DRAWING.

Date	Description	Chkd	Signed
05.10.16	Planning - Rev A	M.G.	M.Gill

HYDRO ENVIRONMENTAL SERVICES
22 Lower Main St
Dungarvan
Co. Waterford
Ireland

tel: +353 (0) 58-44122
tel: +353 (0) 58-44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client:
BORD NA MONA POWERGEN LTD

Job:
BALLIVOR WIND FARM,
Co. WESTMEATH/MEATH

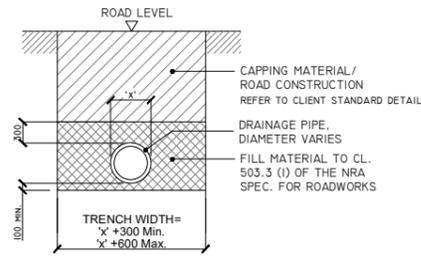
Title:
DRAINAGE DETAILS I

Figure No:
D501

Drawing No: P1510-0-0323-A1-D501-Rev A	
Sheet Size: A1	Project No.: P1510
Scale: as shown (A1)	Drawn By: G.D./M.Gill
Date: 27/03/2023	Checked By: M.G.

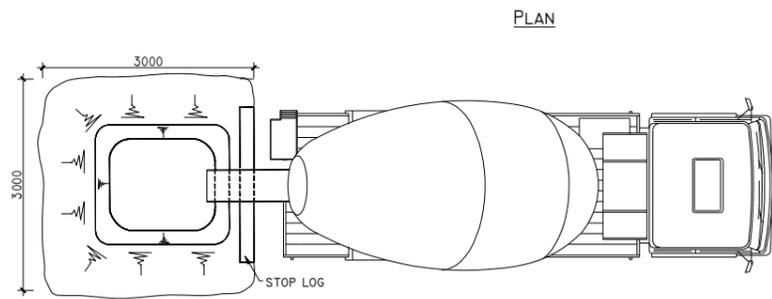
DETAIL F

'TYPE B' CULVERT - DRAINAGE CROSSING BENEATH EXCAVATED ROAD
SCALE 1:50

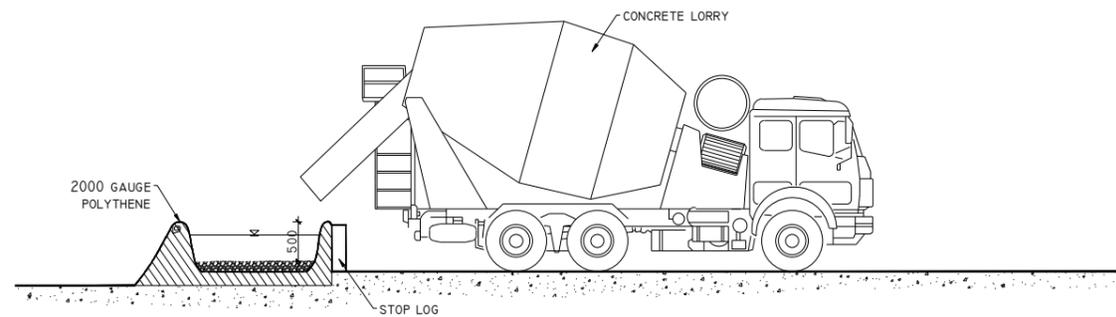


DETAIL I

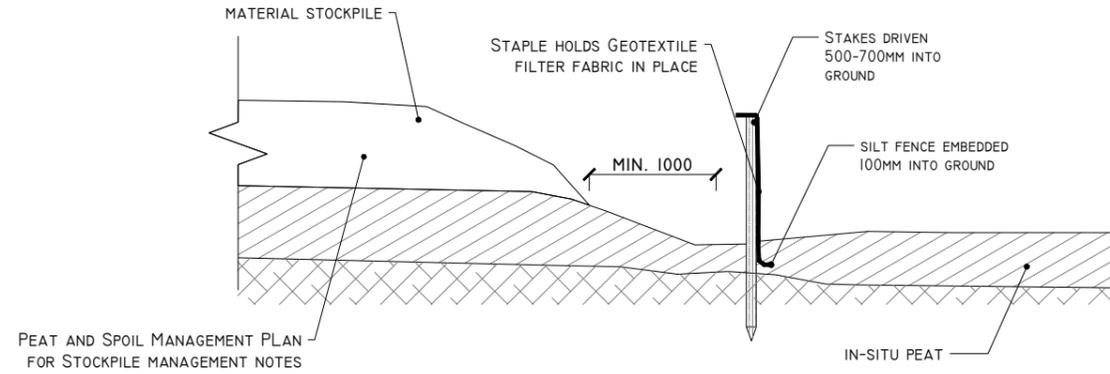
TEMPORARY CONCRETE WASH OUT PIT
SCALE 1:25



ELEVATION

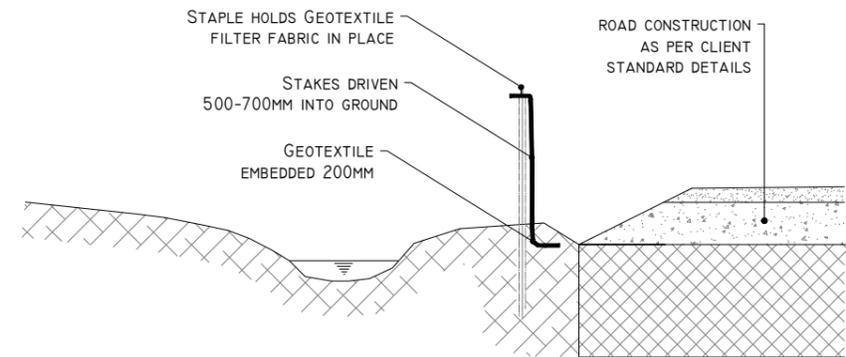


DETAIL G-I



SILT FENCE
SCALE 1:25

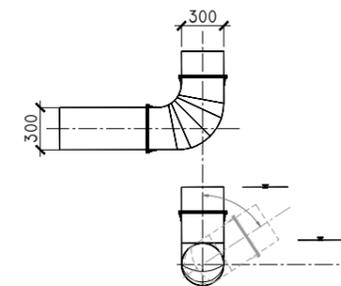
DETAIL G-II



SILT FENCE FOR WATERCOURSE PROTECTION
SCALE 1:25

DETAIL H

90° U BEND AND WATER LEVEL CONTROL MECHANISM
SCALE 1:25



PROJECT DESIGN DRAWING NOTES:
1. PLEASE NOTE THIS DRAWING IS FOR PLANNING PURPOSES ONLY, AND FURTHER DETAILED SPECIFICATION WILL BE REQUIRED FOR THE EXECUTION OF THE WORKS TO ENSURE THEY MEET REQUIRED RELEVANT DESIGN STANDARDS, AND POTENTIAL PLANNING CONDITIONS.
2. DRAWINGS NOT TO BE USED FOR CONSTRUCTION / CONTRACT CONDITIONS.
3. COPYRIGHT, ALL RIGHTS RESERVED. NO PART HERE WITH MAY BE COPIED OR REPRODUCED PARTIALLY OR WHOLLY IN ANY FORM WHATSOEVER WITHOUT THE PRIOR NOTICE OF THE COPYRIGHT OWNER HYDRO-ENVIRONMENTAL SERVICES.
4. DO NOT SCALE OFF THIS DRAWING. FIGURED METRIC DIMENSIONS ONLY SHOULD BE TAKEN OFF THIS DRAWING.
5. THE USE OF OR RELIANCE UPON THIS DRAWING SHALL BE DEEMED TO BE ACCEPTANCE OF THESE CONDITIONS OF USE UNLESS OTHERWISE AGREED IN WRITING. SUCH WRITTEN AGREEMENT TO BE SOUGHT FROM AND ISSUED BY THE COPYRIGHT HOLDER TO THE USE OR RELIANCE UPON THIS DRAWING.

Date	Description	Chkd	Signed
05.10.16	Planning - Rev A	M.G.	M.Gill

Revisions

HYDRO ENVIRONMENTAL SERVICES
22 Lower Main St
Dungarvan
Co. Waterford
Ireland

tel: +353 (0) 58-44122
tel: +353 (0) 58-44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

Client: **BORD NA MONA POWERGEN LTD**

Job: **BALLIVOR WIND FARM, CO. WESTMEATH/MEATH**

Title: **DRAINAGE DETAILS 2**

Figure No: **D502**

Drawing No: **P1510-0-0323-A1-D502-Rev A**

Sheet Size: A1	Project No.: P1510
Scale: as shown (A1)	Drawn By: G.D./M.Gill
Date: 27/03/2023	Checked By: M.G.