

DRAINAGE NOTES:

- ROADWAY SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SHAPE STRAW BALES/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, STRAW BALES / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. PORTABLE SILTTRUSTER SYSTEM TO BE AVAILABLE ON-SITE FOR USE AS REQUIRED ALSO.
- 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 RECEIVING WATER COURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR SWALES / DITCHES TO BE USED TO COLLECT UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DITCHES WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
- DRAINAGE SWALES / DITCHES TO BE EXCAVATED ADJACENT TO THE ACCESS TRACKS. REGULAR CROSS DRAINS TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN THE SWALES / DITCHES. LOCATION 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 >50M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
- BATTERS OF ALL PROPOSED SWALES / DITCHES TO HAVE A SLOPE OF BETWEEN 1:1.5 TO 1:2 DEPENDING UPON SOPTH OF SWALE/DITCH AND WILL BE LEFT AS CUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE SWALES / DITCHES TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT SCOURING. STEEP CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAMINANT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS. PRIOR TO DISCHARGE.
- SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HAND STAND AREAS. POND SIZES DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING D501.
- STRAW BALES / OR SIMILAR AND SILT FENCES TO BE USED ALSO AROUND POOL NEARS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGE OF EXISTING WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY DITCH / EPIHEMERAL CHANNELS.
- SLOPES OF THE SWALES / DITCHES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATE LAYER (PEAT AND/OR SOIL) FROM EXCAVATIONS TO BE STORED LOCALLY AND USED TO LINE SLOPES AND BASE OF SWALES / DITCHES OR LONGITUDINAL MOUNDS OF VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
- 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 SWALE.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. 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 HANDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE DRAINAGE AROUND THE POND.
- OIL FUEL SHOULD BE STORED WITHIN BLANDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.

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.
- SILT WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROAD/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 & MINIMUM 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 TRACK SIDE DITCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
- FLOWING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN FIELD 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 OTHER SIMILAR DISCHARGE CONTROLS.
- VEGETATION WILL NOT BE STRIPPED FROM EXISTING FIELD DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.

EXCAVATIONS

- WHERE DEEP EXCAVATIONS 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

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

SILT TRAPS

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

REFUELLING

- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPERVIOUS SURFACE AND AWAY FROM FIELD DRAINS / DITCHES AND WATERCOURSES / WATERBODIES.
- 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.

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

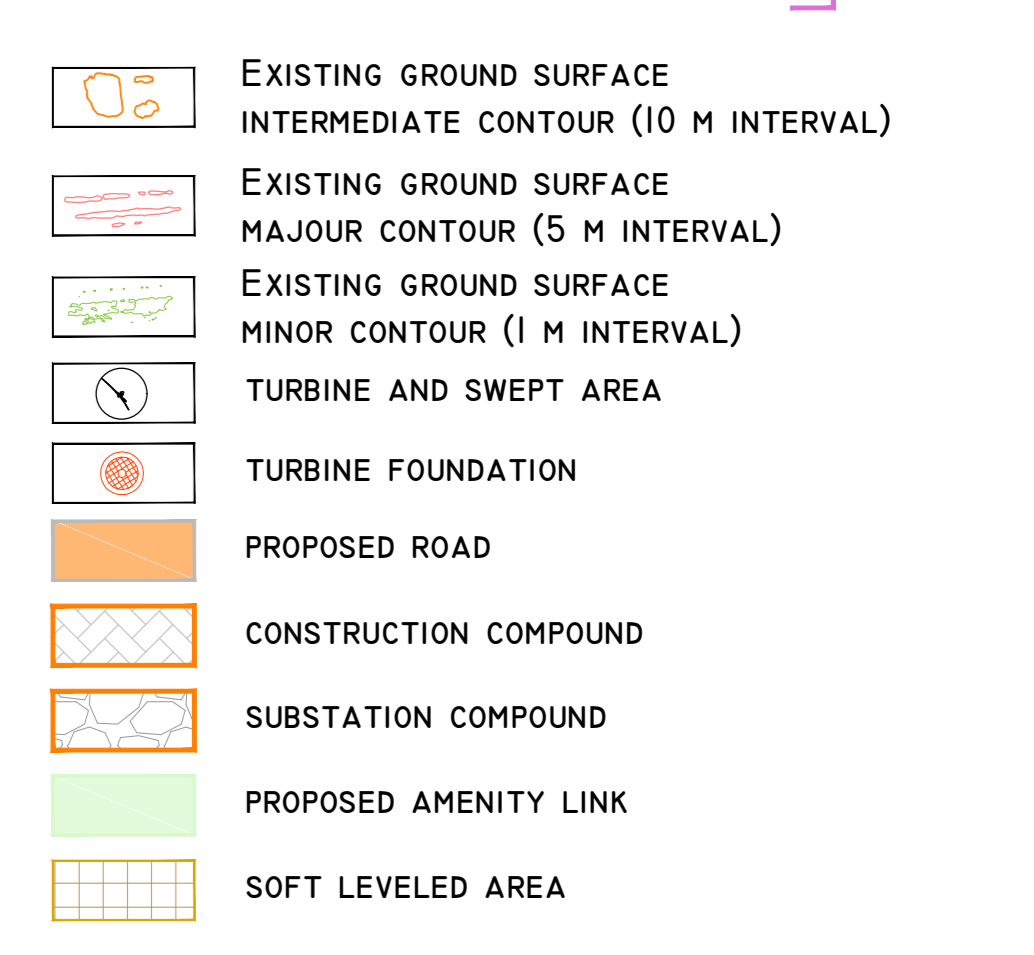
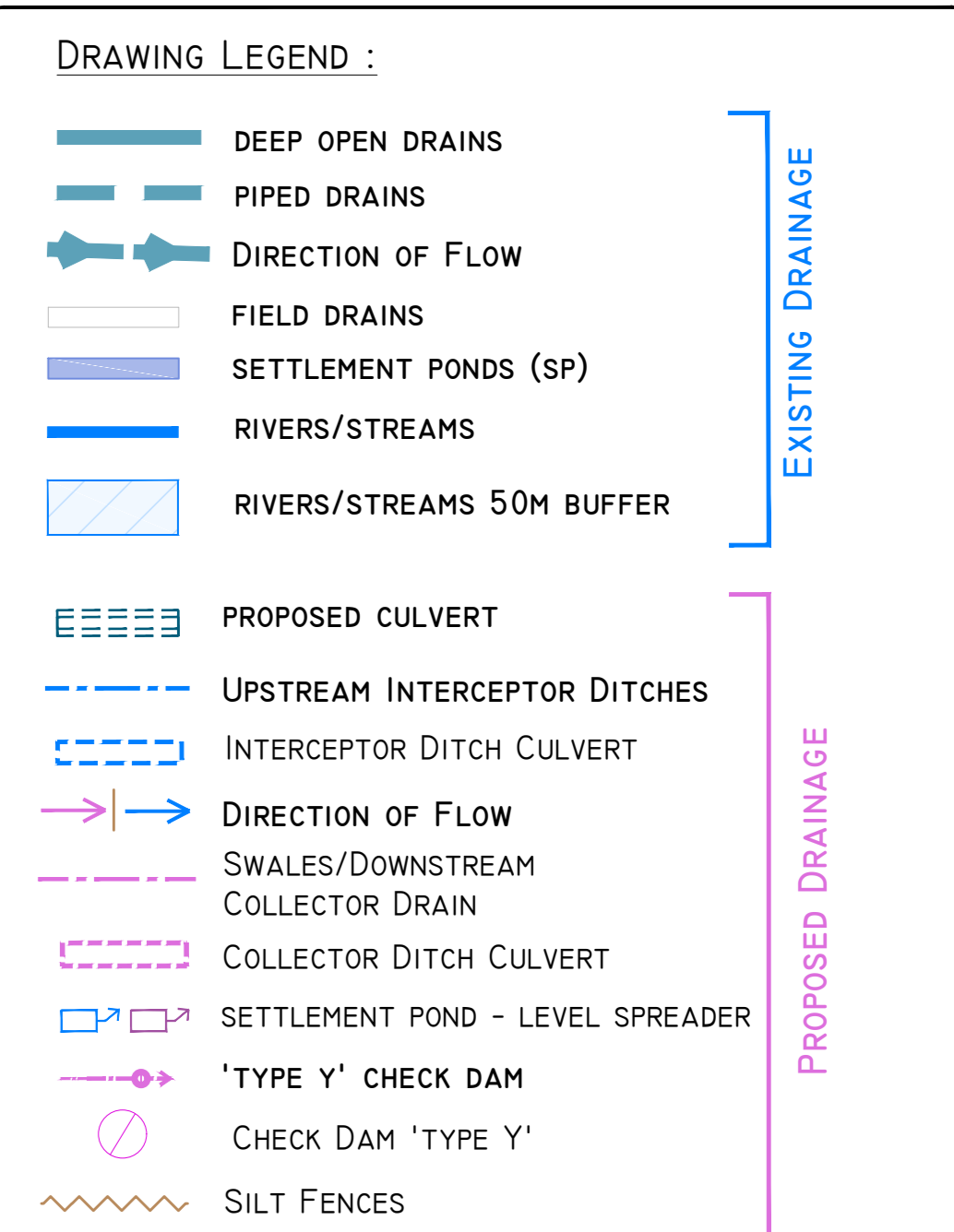
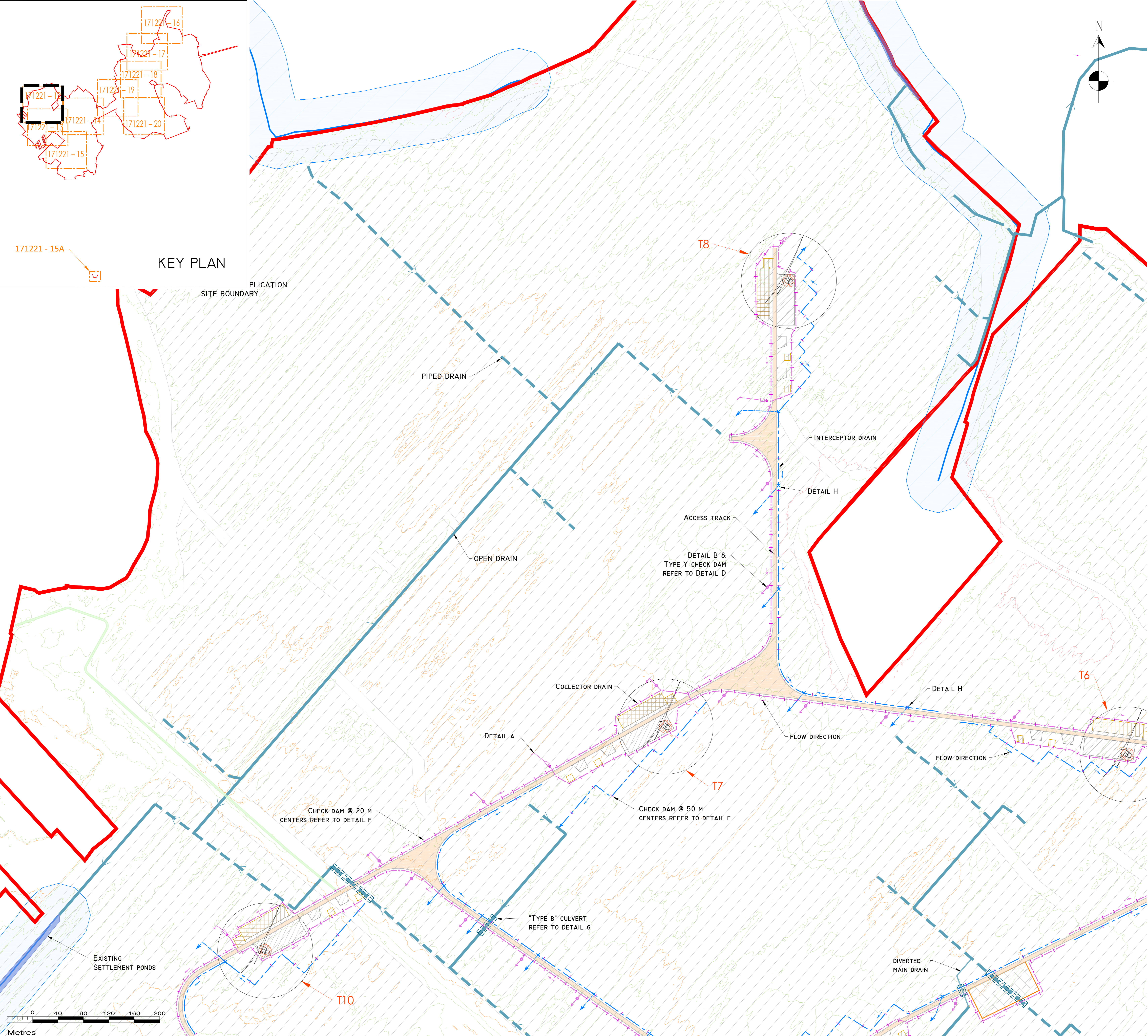
STOP - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

CONTAIN - THE SOURCE OF THE POLLUTION SHOULD BE BLANDED USING A SUITABLE METHOD. 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.

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. WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHERS.
SOURCE CONTROLS:	<ol style="list-style-type: none"> USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS / OVERSIZED SWALES, VEE-DRAINS, DIVERSION DRAINS, FLUMES AND CULVERT PIPES. EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OSTER BAGS FILLED WITH GRAVEL FILTER FABRICS AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WET WEATHERS. COVERING STOCKPILES WEATHERING OFF / SEALING PEAT STOCKPILES
IN-LINE CONTROLS:	<ol style="list-style-type: none"> INTERCEPTOR DRAINS, VEE-DRAINS, OVERSIZED SWALES/COLLECTOR DRAINS EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OSTER BAGS FILLED WITH GRAVEL FILTER FABRICS AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS FLOW LIMITERS WEIR OR BAPPLIES AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. IN STREAM SEDIMENTS COLLECTION SUDS, TEMPORARY SUDS, PUMPING SYSTEMS ATTENUATION LAGOONS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS:	<ol style="list-style-type: none"> TEMPORARY SUDS ATTENUATION PONDS TEMPORARY STORAGE LAGOONS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTTRUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. SILT DEWATERING BAGS
OUTFALL CONTROLS:	<ol style="list-style-type: none"> LEVELSPREADERS SUFFLED OUTFALLS VEGETATION FILTERS SILT DEWATERING BAGS FLOW LIMITERS AND WEIRS



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Date	Description	Chkd	Signed

Revisions

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Job: **DERRINLOUGH WF, CO. OFFALY**

Title: **PROPOSED DRAINAGE LAYOUT**

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- SLEETS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIOR MEASURES SUCH AS THE POSITIONING OF STRAW BALES/SILT FENCING/ OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIES OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
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- WHERE POSSIBLE A BUFFER ZONE OF >50M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
- BATTERS OF ALL PROPOSED SWALES / DITCHES TO HAVE A SLOPE OF BETWEEN 1:1.5 TO 1:2 DEPENDING UPON DEPTH OF SWALE/DITCH AND WILL BE LEFT OUT TO RE-VEGETATE WITH LOCAL SPECIES.
- TRACK SIDE SWALES / DITCHES TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAMINANT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED FOR CONSTRUCTION WITH SETTLEMENT PONDS AND SILT TRAPS PRIOR TO DISCHARGE.
- SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPEND ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING D001.
- STRAW BALES / OR SIMILAR AND SILT FENCES TO BE USED ALSO AROUND SPILL 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 WATERCOURSE WHERE WORKS COMES WITHIN VIEW OF EDGE OF ANY DITCH / EMBANKMENT CHANNELS.
- SLOPES OF THE SWALES / DITCHES TO BE VEGETATED OR PROTECTED FROM EROSION UNTIL VEGETATION HAS BEEN ESTABLISHED. STRIPPED VEGETATIVE LAYER (HEAT 'SOO' OR 'SCRAW') FROM EXCAVATIONS TO BE STORED LOCALLY AND USED TO LINE SLOPES AND BASE OF SWALES / DITCHES OR LONGITUDINAL BARRIERS OF VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
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- BUILD UP OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY MONITORED AS PART OF AN ONGOING GRASSLAND MAINTENANCE PROGRAMME.
- REMOVAL OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF SWALE.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. 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.
- DIESEL FUEL SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.

POLLUTION PREVENTION NOTES:

- SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND GROUNDWATER POLLUTION, SILTATION AND EROSION.
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- SILT WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/STRIPPED 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 A MINIMUM 50M 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 TRAP SIDE DITCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
- PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN FIELDS (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 SLASH PLATES / OTHER SIMILAR DISCHARGE CONTROLS.
- VEGETATION WILL NOT BE STRIPPED FROM EXISTING FIELD DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.

EXCAVATIONS:

- WHERE DEEP EXCAVATIONS 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:

- 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 SWALES WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
- CHECK DAMS TO BE INSPECTED AND CLEANED REGULARLY.

REFUELLING:

- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY, PREFERABLY ON AN IMPROVED SURFACE AND AWAY FROM FIELD DRAINS / DITCHES AND WATERCOURSES / WATERBODIES.
- DIESEL TANKS AND OIL TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.

CONCRETE:

- CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGE OCCURS.
- CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE.

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

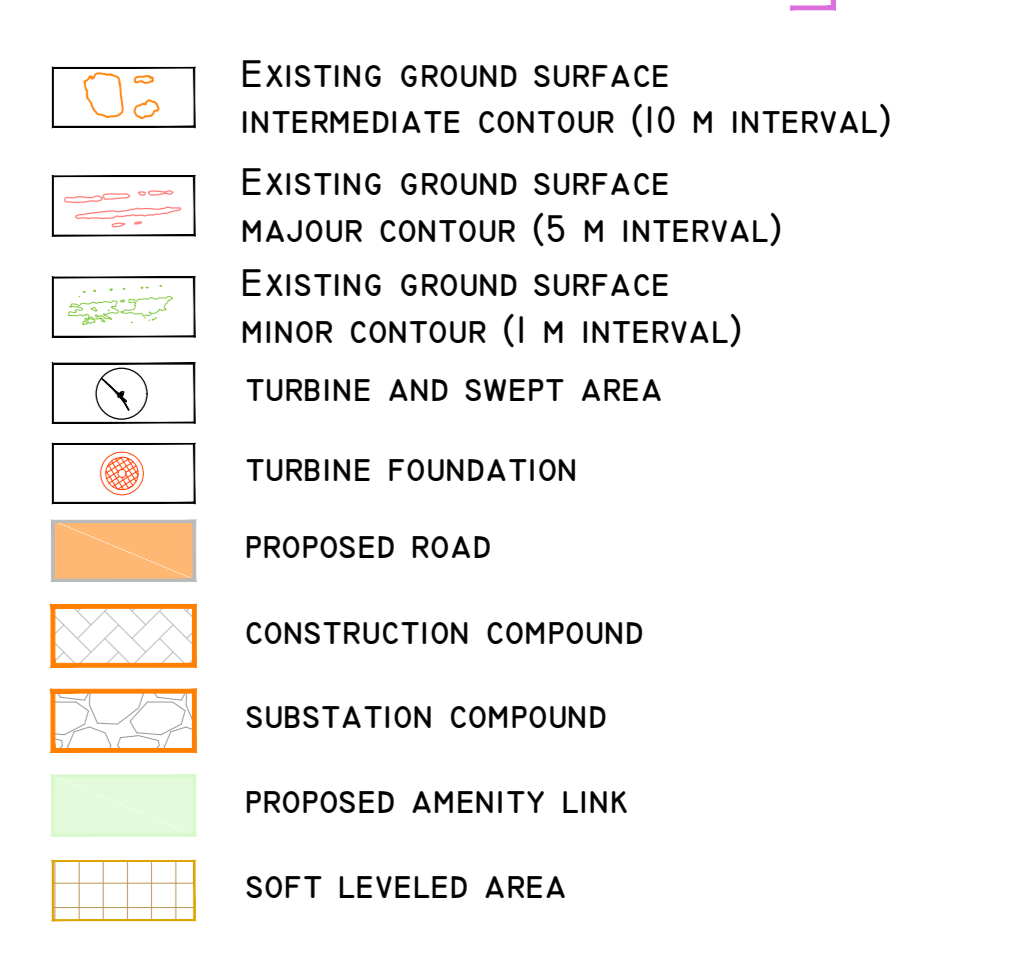
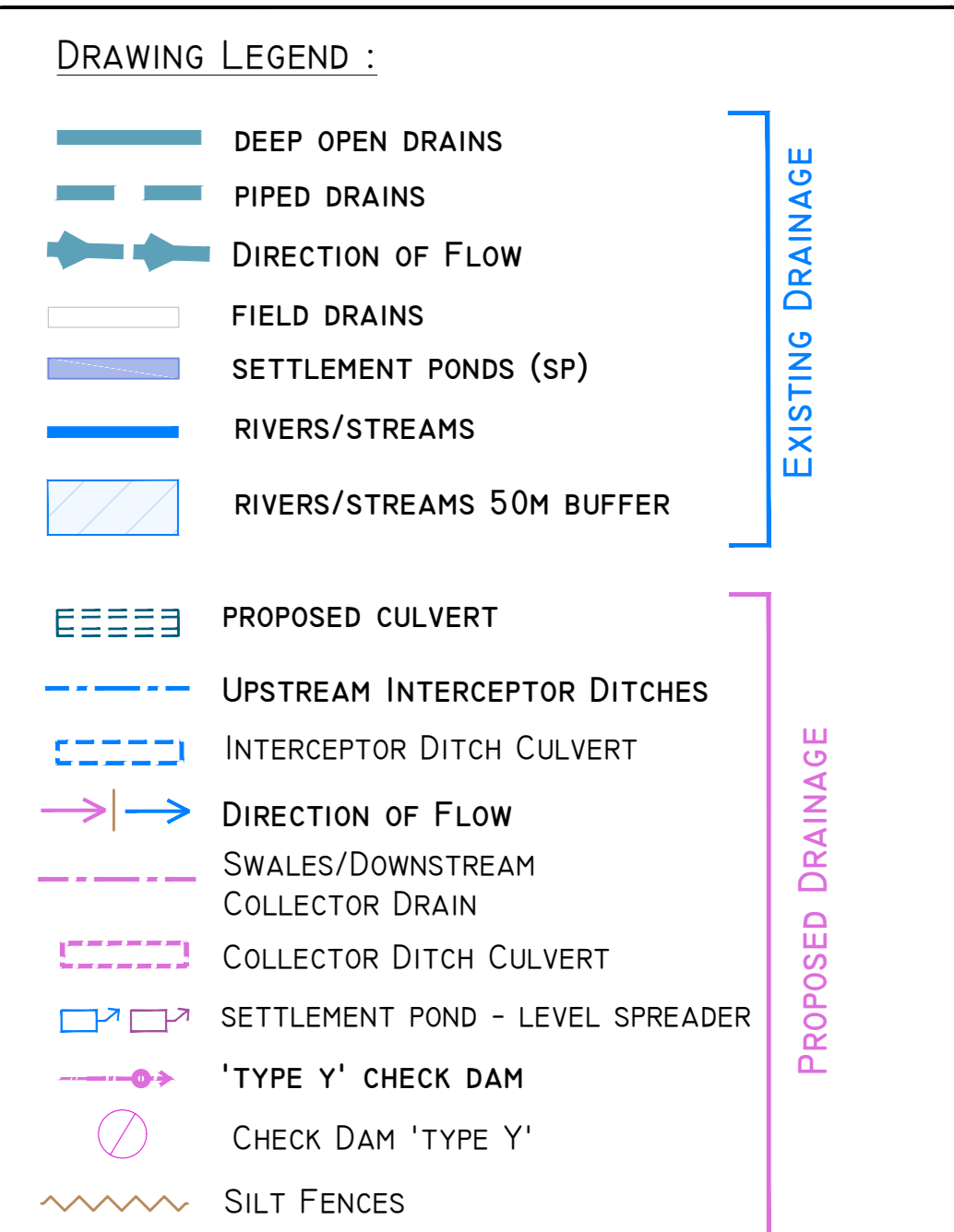
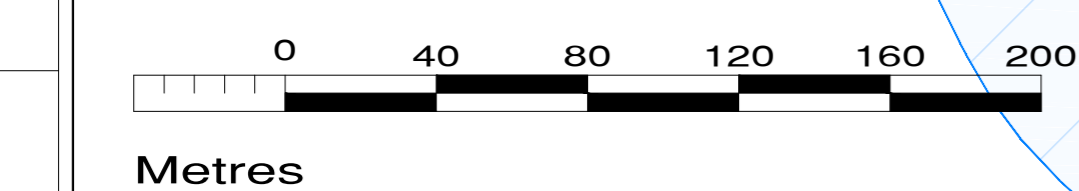
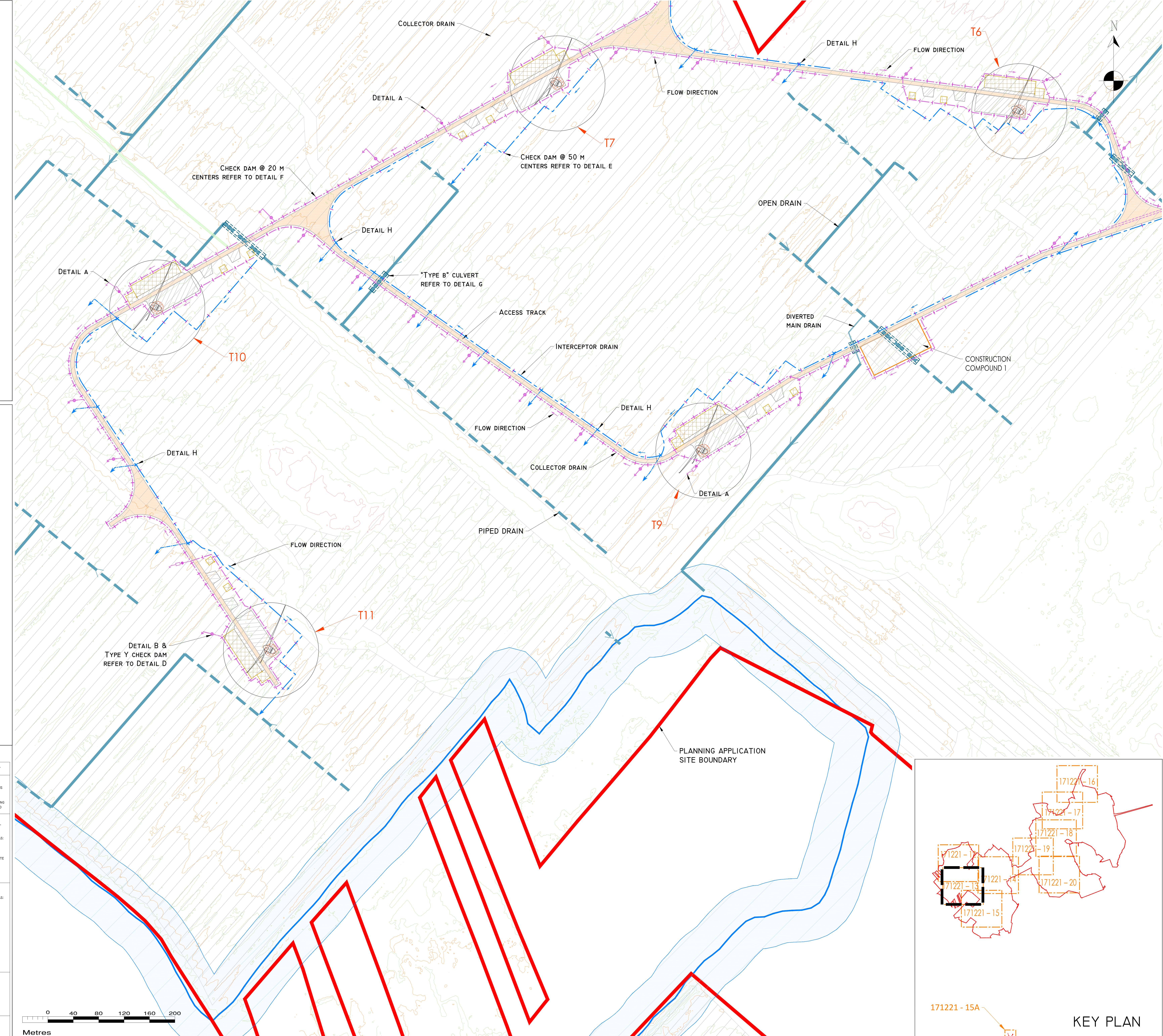
STOP - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

CONTAIN - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.

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

MITIGATION / DRAINAGE CONTROLS AVAILABLE FOR USE ACROSS THE SITE:

MANAGEMENT TYPE	DESCRIPTION OF SLEDS 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 'HOT' WEATHER.
SOURCE CONTROLS	<ol style="list-style-type: none"> USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS / OVERSIZED SWALES, VEE-DRAINS, DIVERSION DRAINS, FLUMES AND CULVERT PIPES EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OSTER BAGS FILLED WITH GRAVEL FILTER FABRICS AND OTHER SIMILAR/EQUIVALENT ON APPROPRIATE SYSTEMS USING SMALL WORKING AREAS COVERING STOCKPILES WEATHERING OFF / SEALING PEAT STOCKPILES
IN-LINE CONTROLS	<ol style="list-style-type: none"> INTERCEPTOR DRAINS, VEE-DRAINS, OVERSIZED SWALES/COLLECTOR DRAINS EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OSTER BAGS FILLED WITH GRAVEL FILTER FABRICS STRAW BALES FLOW LIMITERS WEIRS OR Baffles AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. SILT FENCES, FILTER FABRICS IN STREAM SEDIMENTS COLLECTION Sumps, TEMPORARY Sumps, PUMPING SYSTEMS ATTENUATION LAGOONS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS	<ol style="list-style-type: none"> TEMPORARY Sumps ATTENUATION PONDS TEMPORARY STORAGE LAGOONS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTBOGGER, 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



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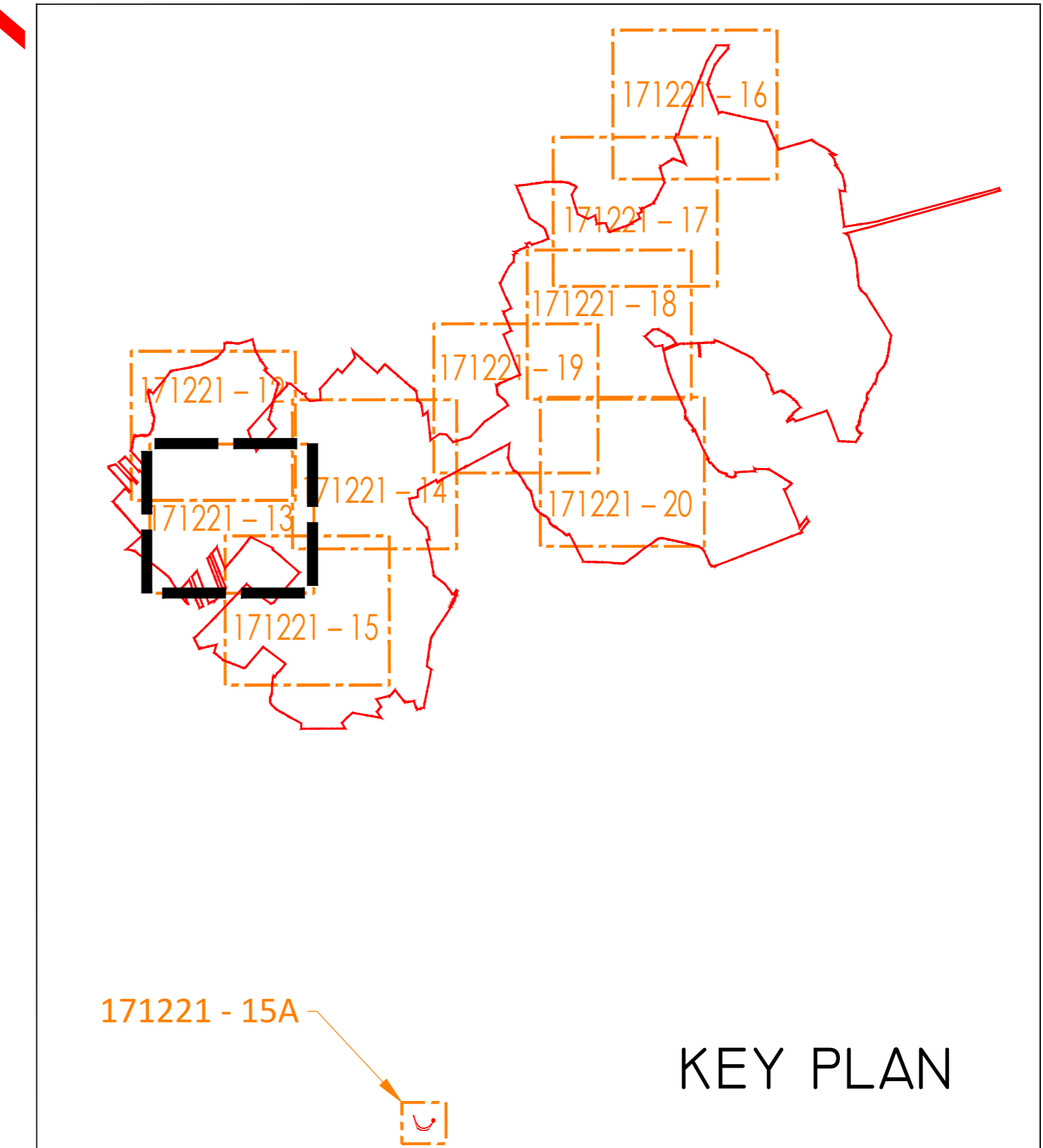
Client: **BORD NA MONA POWERGEN LTD**

Job: **DERRINLOUGH WF, CO. OFFALY**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **171221 - 13**

Drawing No: P1463-0-0220-A0-171221-12-00A
Sheet Size: A0 Project No.: P1463-0
Scale: 1:2,000 (A0) Drawn By: MG / GD
Date: 14/02/2020 Checked By: MG



DRAINAGE NOTES:

- ROADWAY SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- STRAW BALE/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, STRAW BALES / OR SIMILAR ON ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. MOBILE SILTTRUSTERS SYSTEM TO BE AVAILABLE ON SITE FOR USE AS REQUIRED ALSO.
- SILT FENCING TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS 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 CARRIES 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 RECEIVING WATER COURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR SWALES / DITCHES TO BE USED TO COLLECT UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DITCHES WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
- DRAINAGE SWALES / DITCHES TO BE EXCAVATED ADJACENT TO THE ACCESS TRACKS. REGULAR CROSS DRAINS TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN THE SWALES / DITCHES. 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 50M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
- BATTERS OF ALL PROPOSED SWALES / DITCHES TO HAVE A SLOPE OF BETWEEN 1:5 TO 1:2 DEPENDING UPON DEPTH OF SWALE/DITCH AND WILL BE LEFT AS CUT TO BE VEGETATED WITH LOCAL SPECIES.
- TRACK SIDE SWALES / DITCHES TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAMINANT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONSTRUCTION WITH SETTLEMENT PONDS AND SILT TRAPS. PRIOR TO DISCHARGE.
- SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPEND ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING 0001.
- STRAW BALES / OR SIMILAR AND SILT FENCES TO BE USED ALSO AROUND SPOIL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG COSE OF EXISTING WATERCOURSE WHERE WORKS COMES WITHIN 10M OF EDGE OF ANY DITCH / EMBANKMENT CHANNELS.
- SLOPES OF THE SWALES / DITCHES 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 AND USED TO LINE SLOPES AND BASE OF SWALES / DITCHES OR LONGITUDINAL BORDERS OF VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY SOWN / OCCASIONALLY BRAMBLING GRASSES. SUFFICIENT SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-100M CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, DOWN 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.
- SHOULDER OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY MONITORED AS PART OF AN ONGOING MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAMS TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF SWALE.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. 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.
- DIESEL FUEL SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.

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.
- SILT WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROAD/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.

DISCHARGES:

- NO UNCOLLECTED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
- PUMPED WATER WILL BE DIRECTED INTO TRACK SIDE DITCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO DISCHARGE.
- TIPPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN FIELD DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF DISCHARGE/RELEASE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SILT PLATES AND OTHER SIMILAR DISCHARGE CONTROLS.
- VEGETATION WILL NOT BE STRIPPED FROM EXISTING FIELD DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.

EXCAVATIONS:

- WHERE DEEP EXCAVATIONS 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:

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

SILT TRAPS:

- USE OF TRACK SIDE SWALES WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
- CHECK DAMS TO BE INSPECTED AND CLEANED REGULARLY.
- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY. REFUELLING ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / DITCHES AND WATERCOURSES / WATERBODIES.
- SILT TRAPS 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 DISCHARGE OCCUR.
- CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE.

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

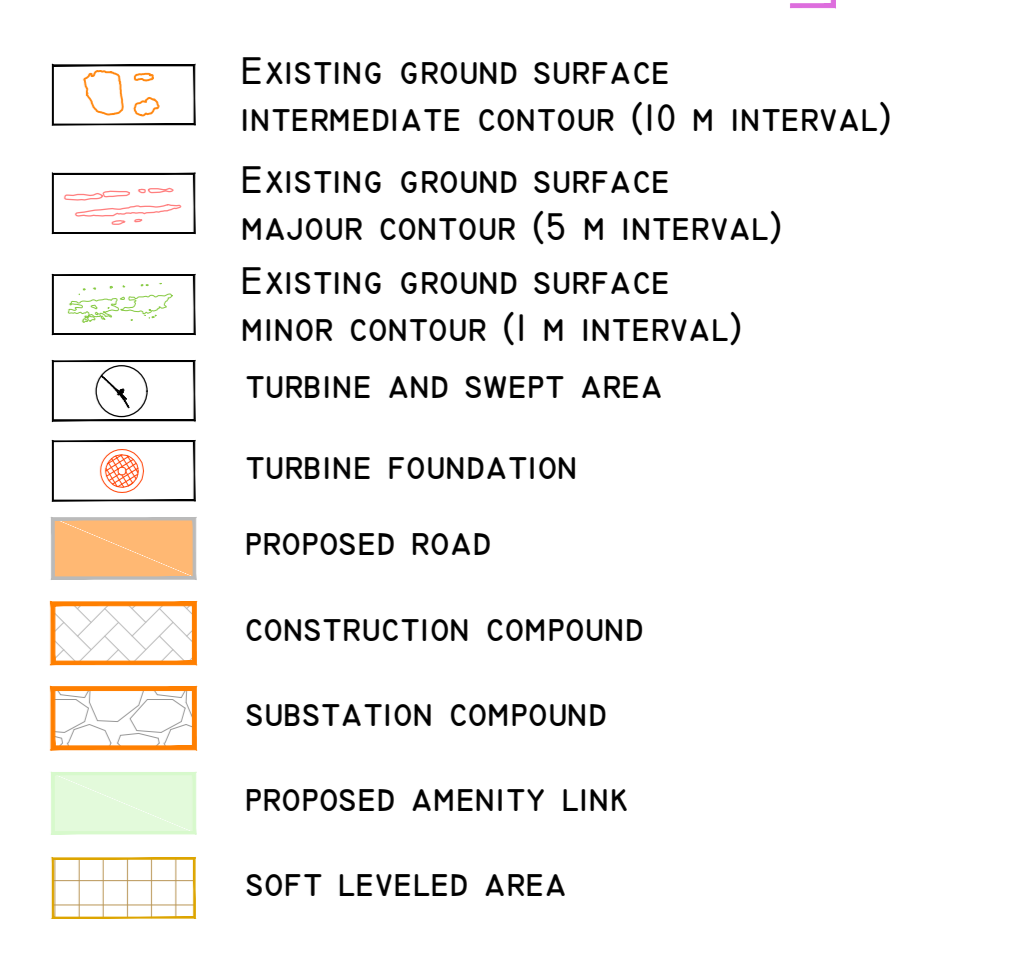
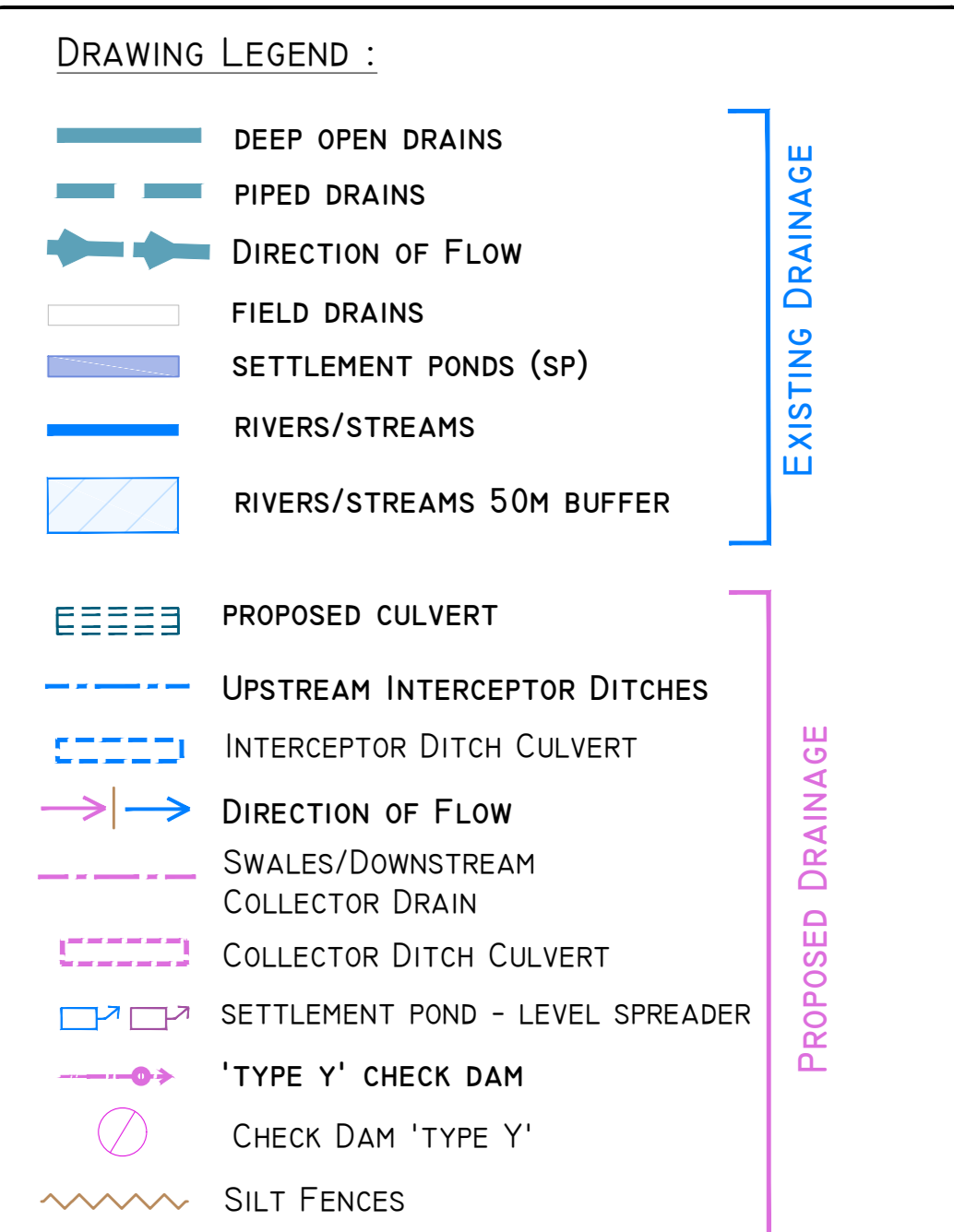
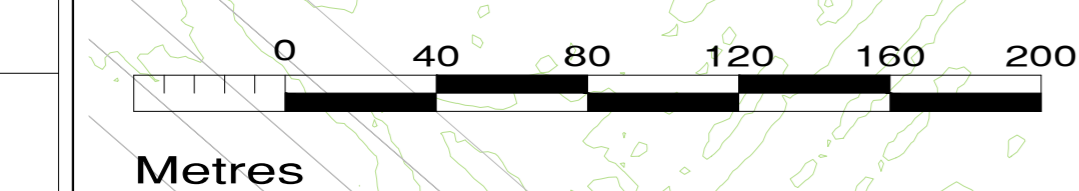
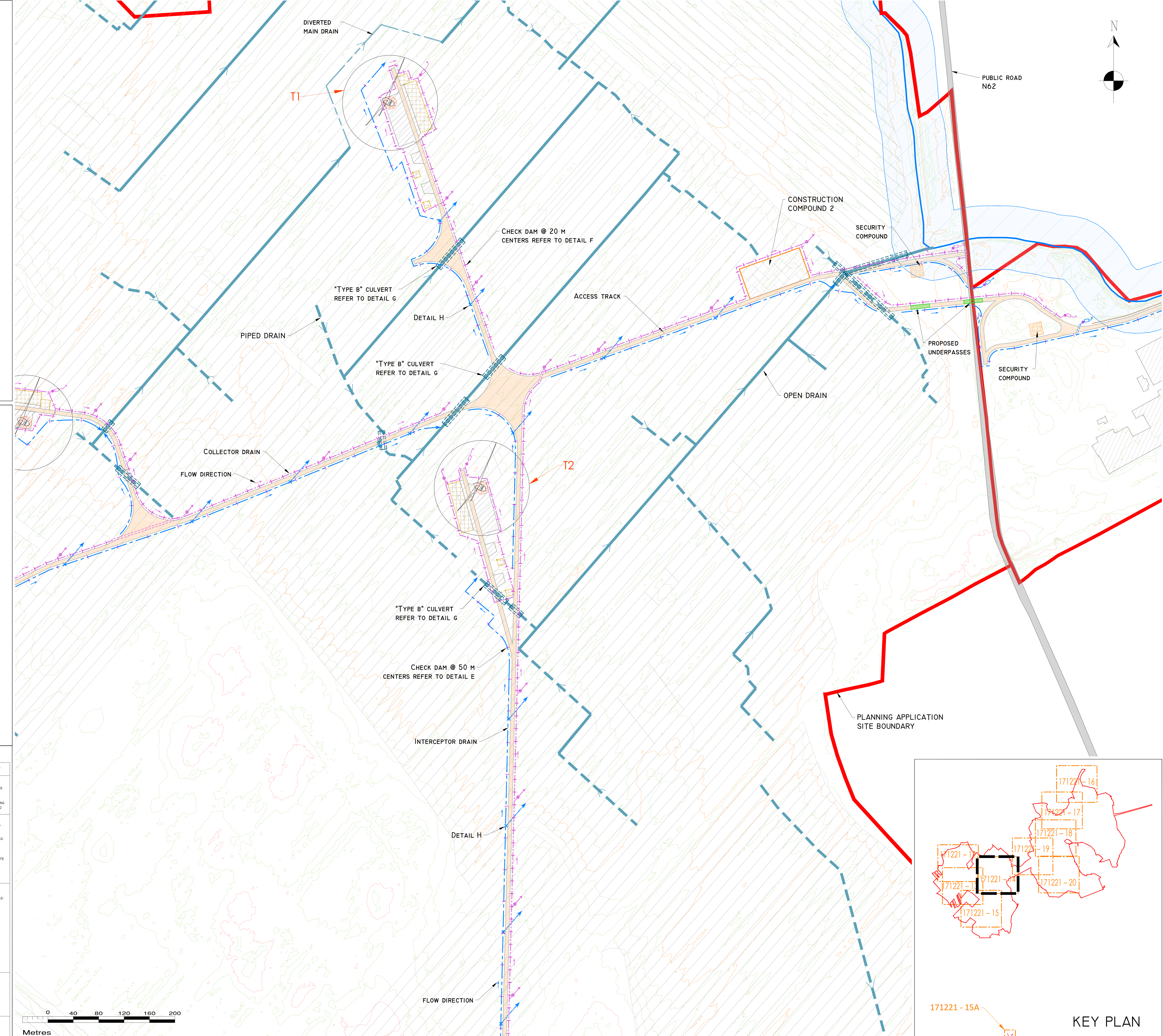
STOP - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

CONTAIN - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. 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 DOWNTHEAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

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 BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE.
SOURCE CONTROLS:	<ol style="list-style-type: none"> EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OSTER BAGS FILLED WITH GRAVEL FILTER FABRICS AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS USING SMALL WORKING AREAS COVERING STOCKPILES WEATHERING OFF / SEALING PEAT STOCKPILES
IN-LINE CONTROLS:	<ol style="list-style-type: none"> INTERCEPTOR DRAINS, VEE-DRAINS, OVERSIZED SWALES/COLLECTOR DRAINS EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OSTER BAGS FILLED WITH GRAVEL FILTER FABRICS STRAW BALES FLOW LIMITERS WEIRS OR BARRIERS AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS SILT FENCES, FILTER FABRICS IN STREAM SEDIMENTS COLLECTION SUPPS, TEMPORARY SUPPS, PUMPING SYSTEMS ATTENUATION LAGOONS
WATER TREATMENT CONTROLS:	<ol style="list-style-type: none"> TEMPORARY SUPPS ATTENUATION PONDS TEMPORARY STORAGE LAGOONS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTTRUSTERS, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS SILT DEWATERING BAGS
OUTFALL CONTROLS:	<ol style="list-style-type: none"> LEVEL SPREADERS BUFFERS/SWALES VEGETATION FILTERS SILT DEWATERING BAGS FLOW LIMITERS AND WEIRS



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Client: **BORD NA MONA POWERGEN LTD**

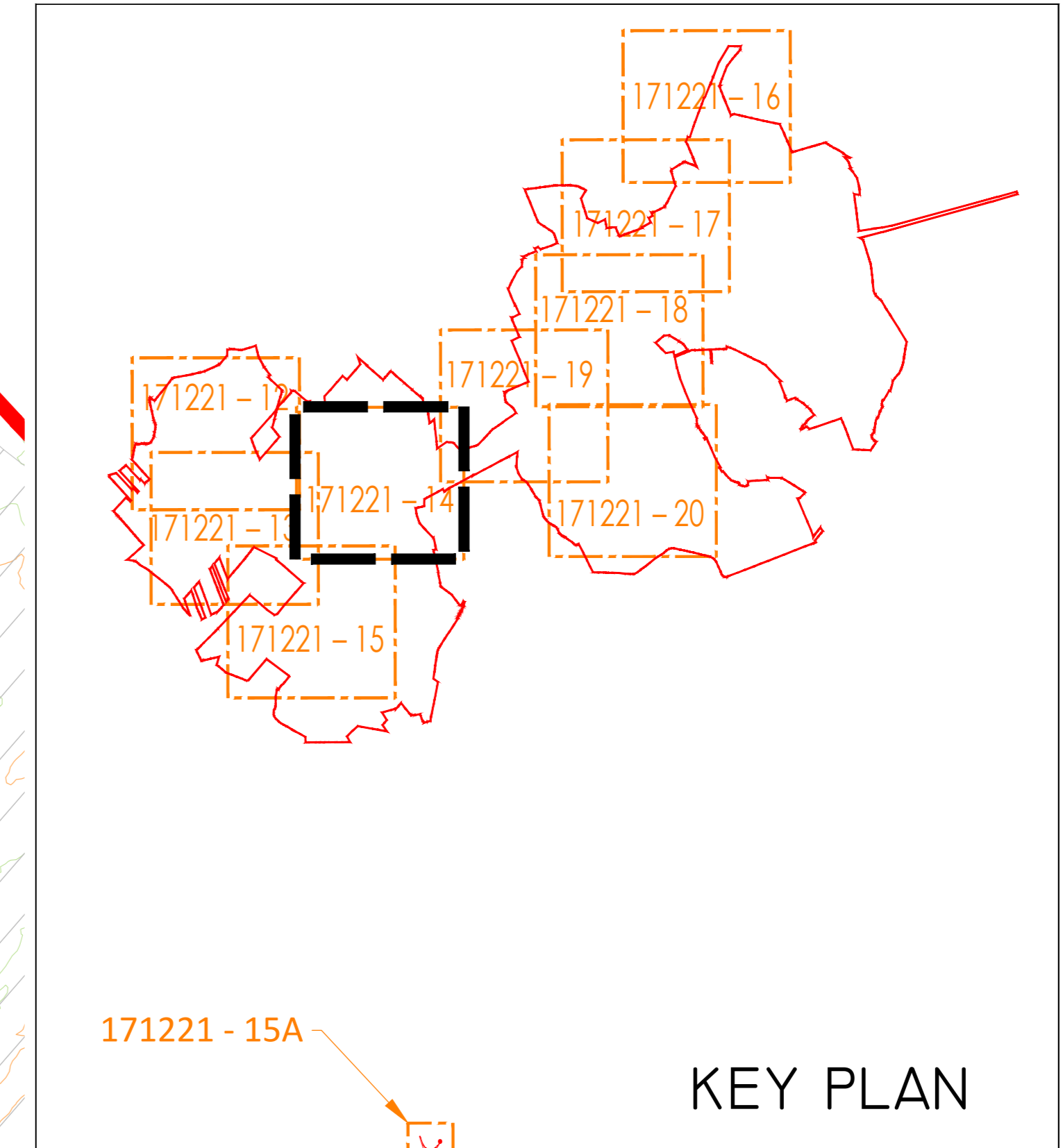
Job: **DERRINLOUGH WF, CO. OFFALY**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **171221 - 14**

Drawing No: P1463-0-0220-A0-171221-14-00A

Sheet Size: A0 Project No.: P1463-0
 Scale: 1:2,000 (A0) Drawn By: MG / GD
 Date: 14/02/2020 Checked By: MG



171221 - 15

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171221 - 20

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KEY PLAN

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. SILT WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROAD TRACKS, AND SIGNIFICANCE OF EXISTING FIELD DRAINAGE AND DITCHES.
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 A MINIMUM 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 TRACK SIDE DITCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO FLOW AND DISCHARGE.
7. FLOWING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN FIELD DRAINAGE/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT ANY POINT OF DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND OTHER SIMILAR EROSION CONTROL.
8. VEGETATION WILL NOT BE STRIPPED FROM EXISTING FIELD DRAINAGE/DITCHES UNLESS ABSOLUTELY NECESSARY.

EXCAVATIONS:

9. WHERE DEEP EXCAVATIONS 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. THE AMOUNT OF EXPOSED GROUND AND TEMPORARY STOCKPILES OPEN AT ANY ONE TIME WILL BE MINIMISED, AS FAR AS PRACTICABLE.

SILT TRAPS:

11. USE OF TRACK SIDE SWALES WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
12. CHECK DAMS 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 / DITCHES AND WATERCOURSES / WATERBODIES.
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 DISCHARGE OCCUR.
16. CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE.

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

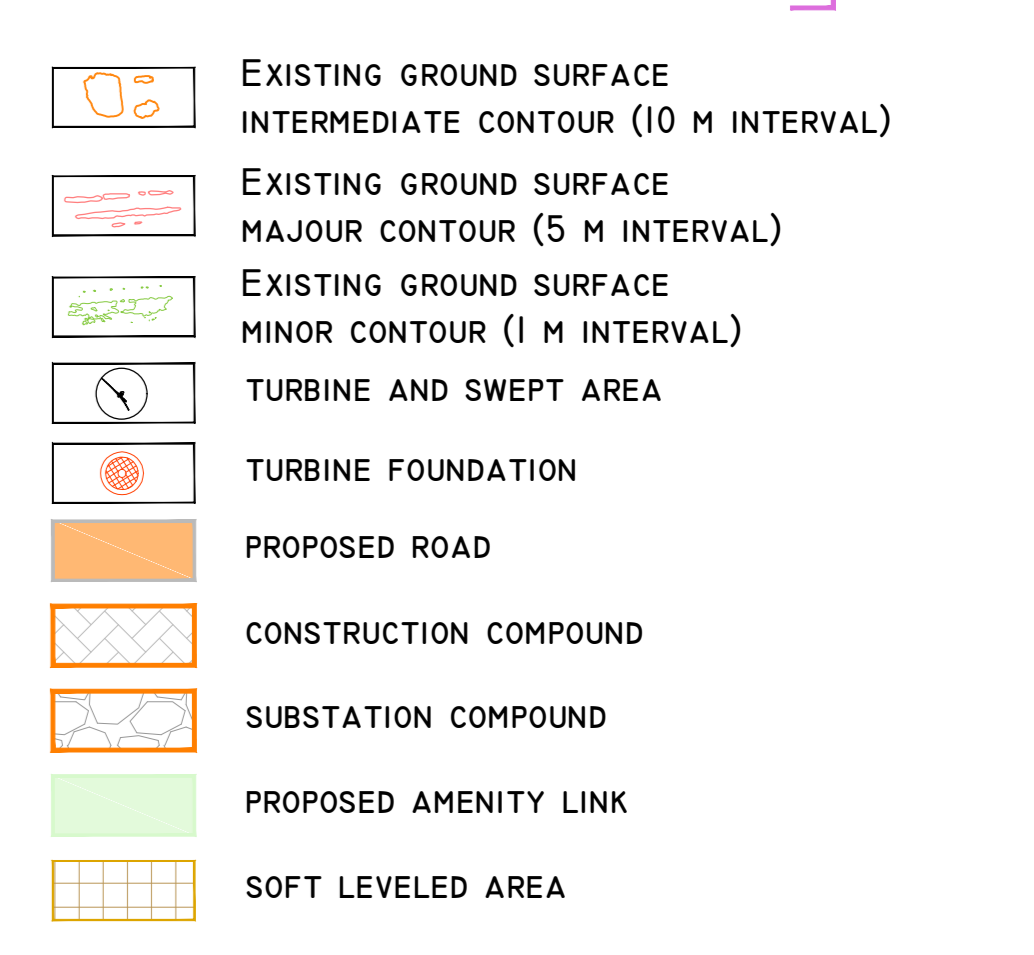
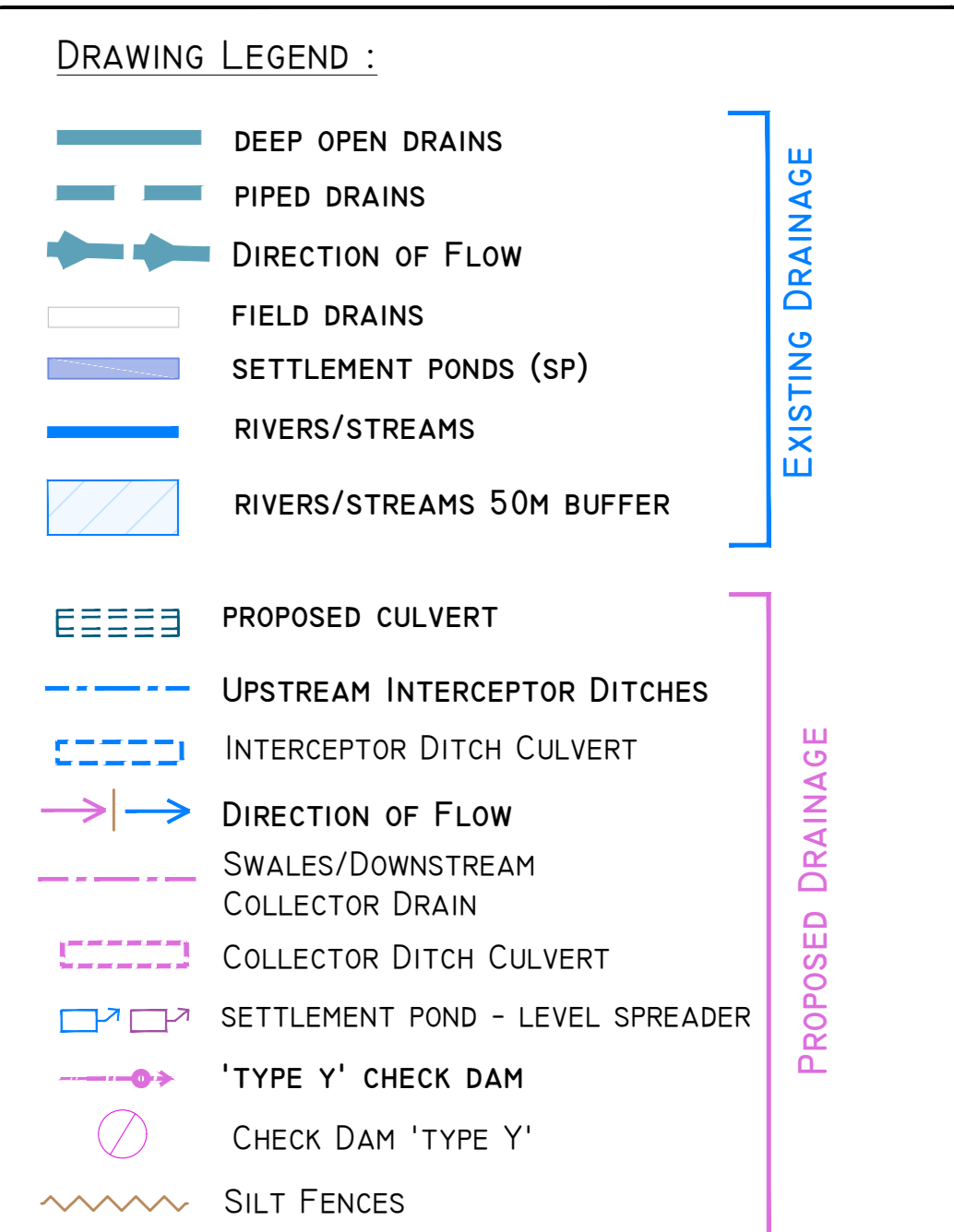
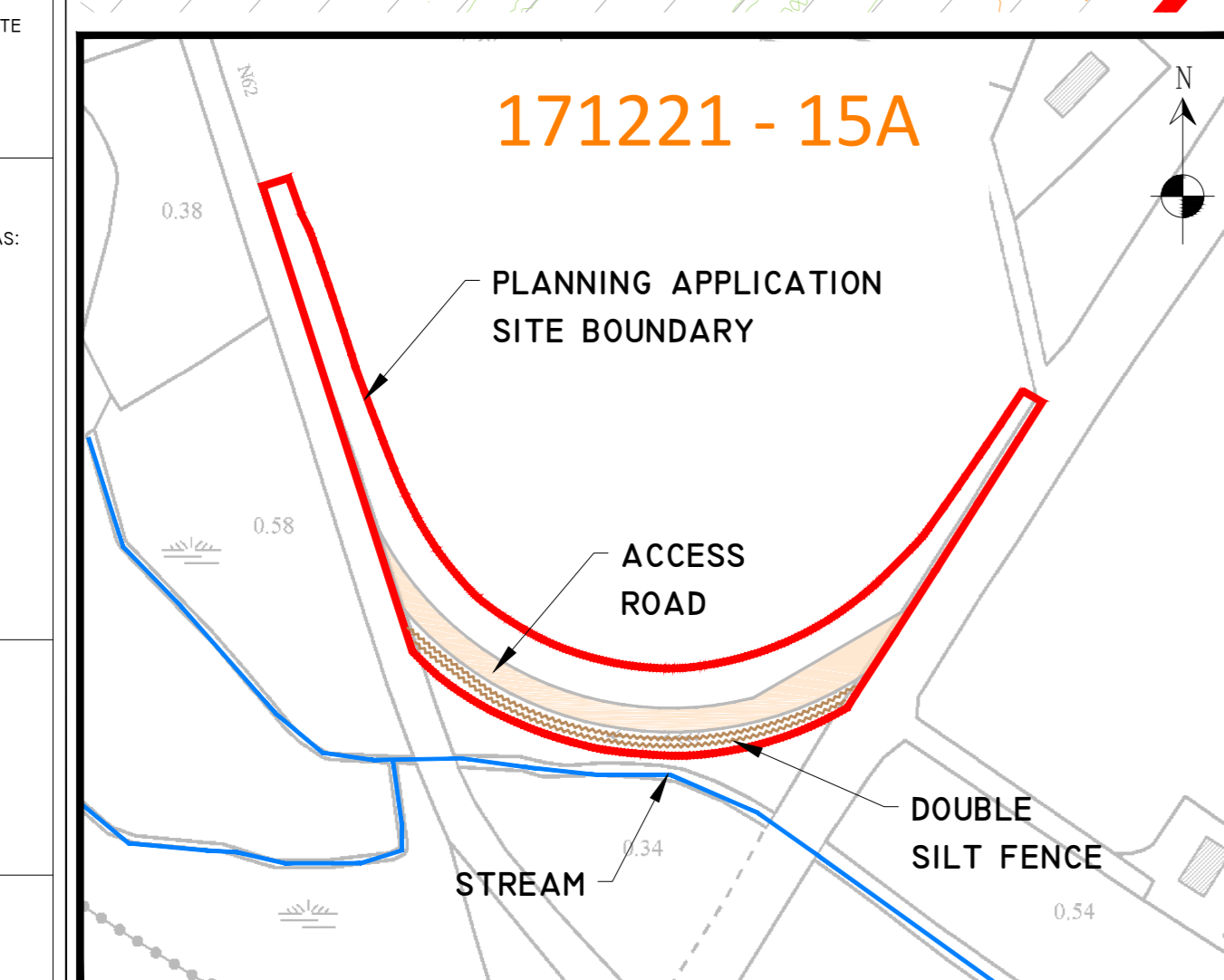
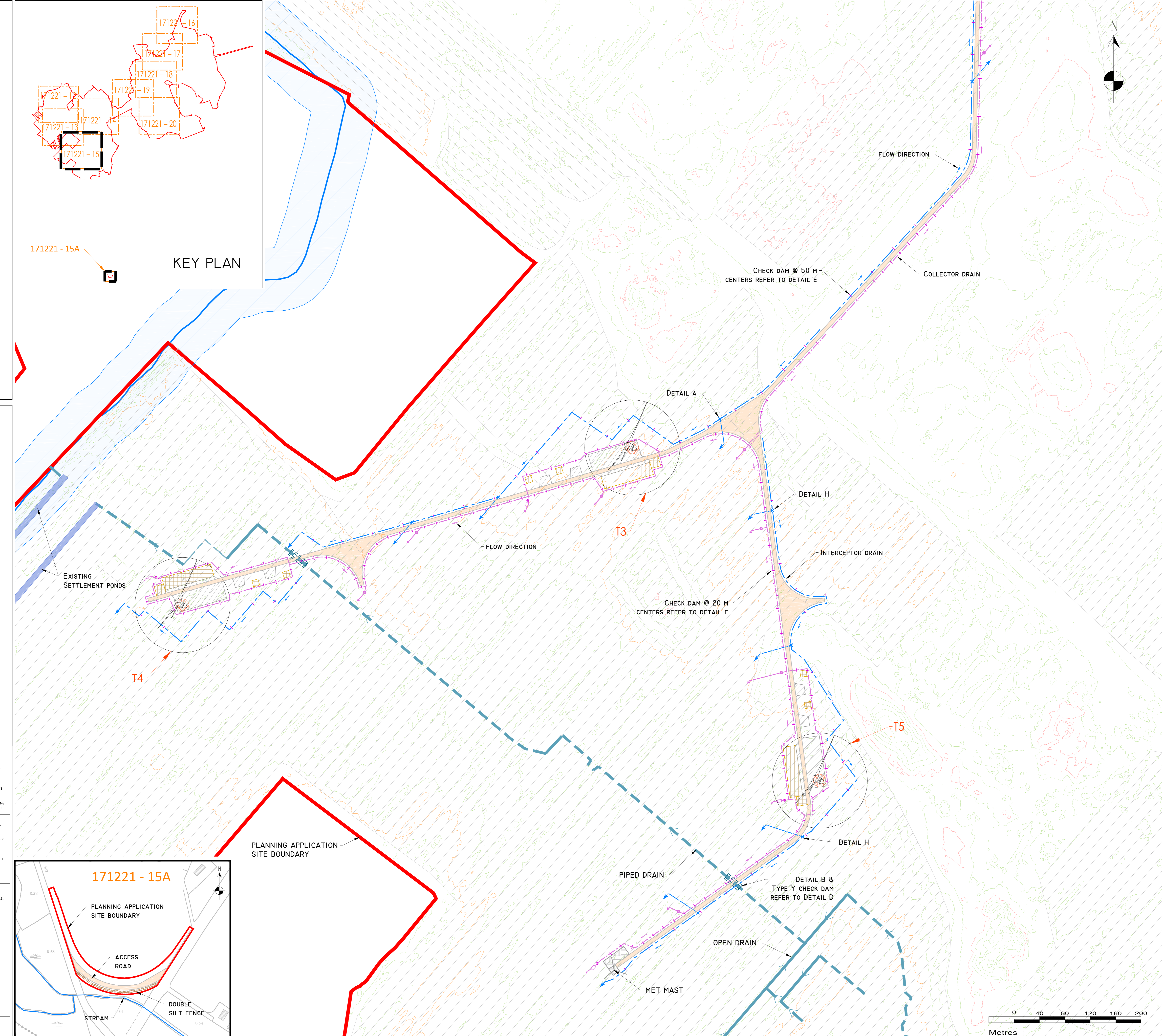
STOP - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

CONTAIN - THE SOURCE OF THE POLLUTION SHOULD BE RAISED USING A SUITABLE METHOD. 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 DOWNTHEAM TO PROTECT FISHERIES AND OTHER SENSITIVE AREAS.

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"> 1) APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE. 2) APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE.
SOURCE CONTROLS:	<ol style="list-style-type: none"> 1) USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNTHEAM COLLECTOR DRAINS / OVERSIZED SWALES, VEGETATION, DIVERSION DRAINS, FLUMES AND GULCHET PIPES. 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) FILTER FABRICS D) AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 3) VEGETATION STRIPPS 4) COVERING STOCKPILES
IN-LINE CONTROLS:	<ol style="list-style-type: none"> 1) INTERCEPTOR DRAINS, VEGETATION, OVERSIZED SWALES/COLLECTOR DRAINS 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> A) SAND BAGS B) OYSTER BAGS FILLED WITH GRAVEL C) FILTER FABRICS D) STRAW BALES E) FLOW LIMITERS F) WEIRS OR BAPPLERS G) AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. 3) SILT FENCES, FILTER FABRICS 4) IN STREAM SEDIMENTS 5) COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS 6) ATTENUATION LAGOONS 7) SLOTTED TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS:	<ol style="list-style-type: none"> 1) TEMPORARY SUMPS 2) TEMPORARY STORAGE LAGOONS 3) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS 4) PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTTRUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. 5) SALT DEWATERING BAGS
OUTFALL CONTROLS:	<ol style="list-style-type: none"> 1) LEVELSPREADERS 2) BUFFERED OUTFALLS 3) VEGETATION FILTERS 4) SALT DEWATERING BAGS 5) FLOW LIMITERS AND WEIRS



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Revisions			

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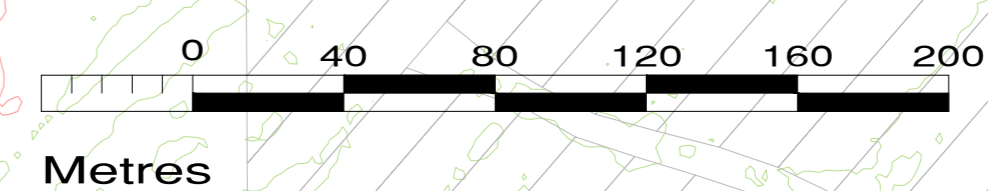
Job: DERRINLOUGH WF, CO. OFFALY

Title: PROPOSED DRAINAGE LAYOUT

Figure No: 171221 - 15

Drawing No: P1463-0-0220-A0-171221-15-00A

Sheet Size: A0 **Project No.:** P1463-0
Scale: 1:2,000 (A0) **Drawn By:** MG / GD
Date: 14/02/2020 **Checked By:** MG



171221 - 16

171221 - 17

171221 - 18

171221 - 19

171221 - 20

171221 - 15A

KEY PLAN

DRAINAGE NOTES:

- ROADS SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SPARE STRAW BALES/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, STRAW BALES / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. PEOPLE SILTTRUSTER SYSTEM TO BE AVAILABLE ON SITE FOR USE AS REQUIRED ALSO.
- SILTS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIOR MEASURES SUCH AS THE PLACEMENT OF STRAW BALES/SILT FENCING/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 RECEIVING WATER COURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR SWALES / DITCHES TO BE USED TO COLLECT UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DITCHES WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
- DRAINAGE SWALES / DITCHES TO BE EXCAVATED ADJACENT TO THE ACCESS TRACKS. REGULAR CROSS DRAINS BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN THE SWALES / DITCHES. 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 50M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACKS SWALES / DITCHES.
- BATTERS OF ALL PROPOSED SWALES / DITCHES TO HAVE A SLOPE OF BETWEEN 1:1.5 TO 1:2 DEPENDING UPON DEPTH OF SWALE/DITCH AND WILL BE LEFT AS CUT TO BE VEGETATED WITH LOCAL SPECIES.
- TRACK SIDE SWALES / DITCHES TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT SCOURING. 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 CONSULTATION WITH SETTLEMENT PONDS AND SILT TRAPS, FROM TO DISCHARGE.
- SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPENDING ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING D50.
- STRAW BALES / OR SIMILAR AND SILT FENCES TO BE USED ALSO AROUND SPILL HEAPS TO MITIGATE SILT RUNOFF. SILT FENCES MAY BE REMOVED WHEN SUITABLE VEGETATION COVER IS ESTABLISHED.
- SILT FENCES TO BE PROVIDED ALONG EDGES OF EXISTING WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY DITCH / EMBANKMENT CHANNELS.
- SLOPES OF THE SWALES / DITCHES 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 AND USED TO LINE SLOPES AND BASES OF SWALES / DITCHES OR CONDITIONAL MOUND OF VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
- 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.
- RIPEL OF SILT LEVELS AT CHECK DAMS TO BE REMOVED AND DISPOSED OF APPROPRIATELY. SILT LEVELS AT CHECK DAMS TO BE VISUALLY MONITORED AS PART OF AN ONGOING DRAINAGE MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAMS TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF SWALE.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. 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 FURNISH PART OF THE EMBANKMENT AROUND THE POND.
- OIL FUEL SHOULD BE STORED WITHIN BUNGED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS AS NECESSARY.

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.
- SILT WATER CAN ARISE FROM DEWATERING EXCAVATIONS, EROSION OF EXPOSED/STRIPPED SOILS, TEMPORARY STOCKPILES, PLANT AND MACHINERY 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 A MINIMUM 10M 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 TRACK SIDE DITCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO DISCHARGE.
- PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN FIELD 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 OTHER SIMILAR DISCHARGE CONTROLS.
- VEGETATION WILL NOT BE STRIPPED FROM EXISTING FIELD DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.

EXCAVATION:

- WHERE DEEP EXCAVATIONS 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:

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

SILT TRAPS:

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

REFUELLING:

- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY. REFUELLING ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / DITCHES AND WATERCOURSES / WATERBODIES.
- SPILL KITS AND DUMP 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.

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

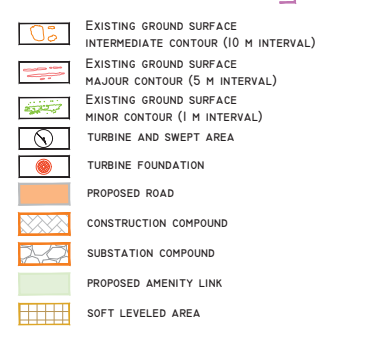
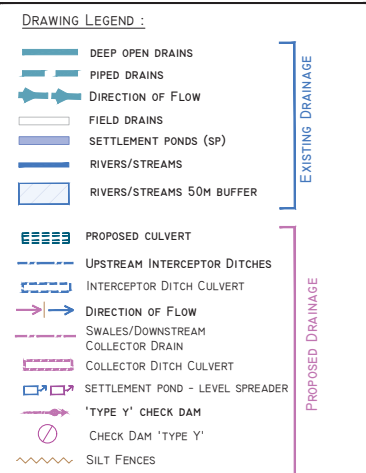
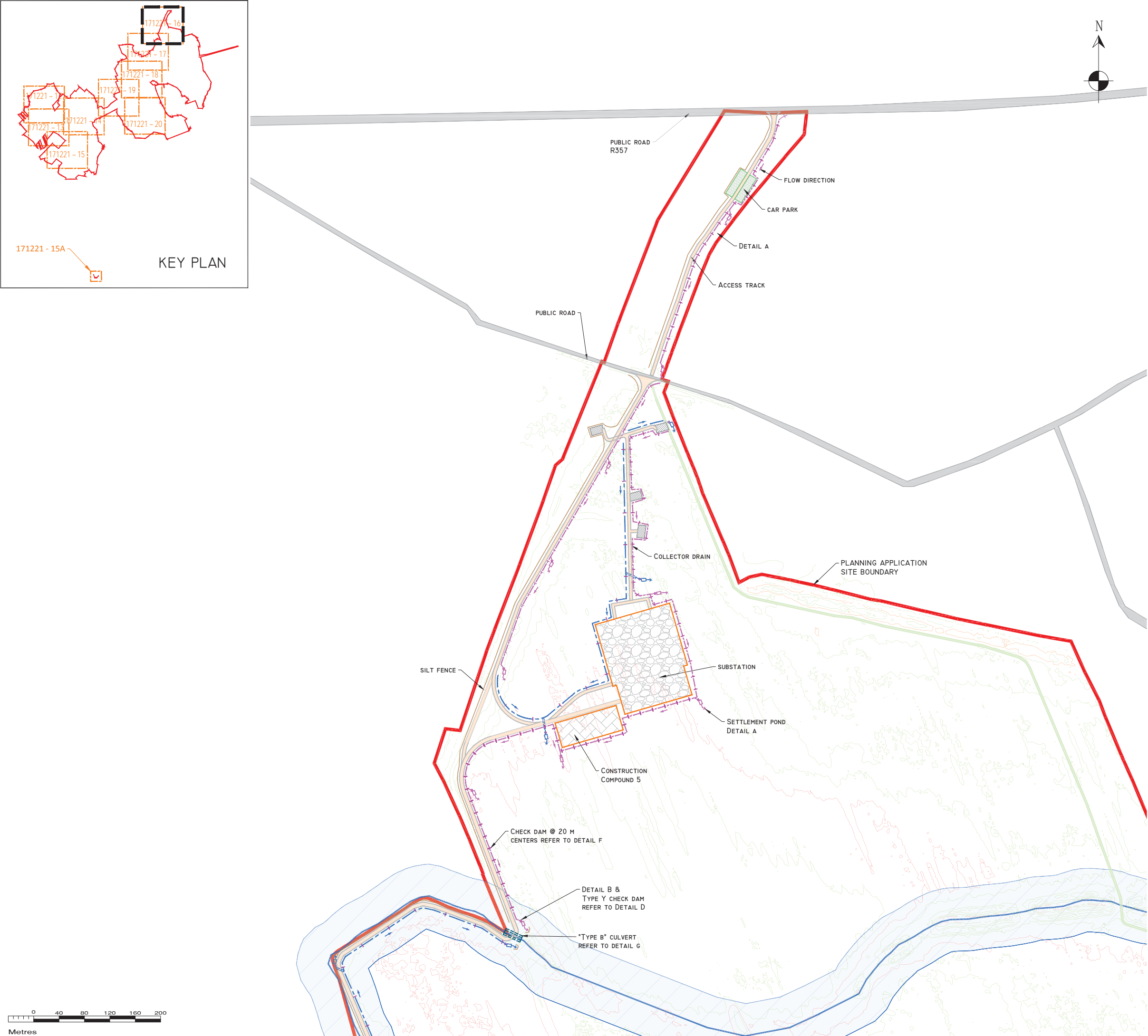
STOP - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

CONTAIN - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.

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

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 USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS / OVERSIZED SWALES, HEE-DRAINS, DIVERSION DRAINS, FLUMES AND CULVERT PIPES EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OSTER BAGS FILLED WITH GRAVEL FILTER FABRICS AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS USING SMALL WORKING AREAS COVERING STOCKPILES WEATHERING OFF / SEALING PEAT STOCKPILES
SOURCE CONTROLS	<ol style="list-style-type: none"> INTERCEPTOR DRAIN, VEE-DRAINS, OVERSIZED SWALES/COLLECTOR DRAINS EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OSTER BAGS FILLED WITH GRAVEL FILTER FABRICS STRAW BALES FLOW LIMITERS WEIRS OR BAYLES AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS SILT FENCES, FILTER FABRICS IN STREAM SEDIMENTS COLLECTION SUPPS, TEMPORARY SUPPLY PUMPING SYSTEMS ATTENUATION LAGOONS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
IN-LINE CONTROLS	<ol style="list-style-type: none"> TEMPORARY DAMPS ATTENUATION PONDS TEMPORARY STORAGE LAGOONS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTTRUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS SILT DEWATERING BAGS
WATER TREATMENT CONTROLS	<ol style="list-style-type: none"> LEVELSPREADERS BUFFERED OUTFALLS VEGETATION FILTERS SILT DEWATERING BAGS FLOW LIMITERS AND WEIRS
OUTFALL CONTROLS	<ol style="list-style-type: none"> LEVELSPREADERS BUFFERED OUTFALLS VEGETATION FILTERS SILT DEWATERING BAGS FLOW LIMITERS AND WEIRS



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Revisions			

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Client: **BORD NA MONA POWERGEN LTD**

Job: **DERRINLOUGH WF, CO. OFFALY**

Title: **PROPOSED DRAINAGE LAYOUT**

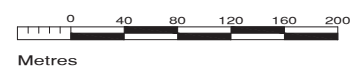
Figure No: **171221 - 16**

Drawing No: **P1463-0-0220-A0-171221-16-00A**

Sheet Size: **A0** Project No.: **P1463-0**

Scale: **1:2,000 (A0)** Drawn By: **MG / GD**

Date: **14/02/2020** Checked By: **MG**



DRAINAGE NOTES:

- ROADWAY SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- SHAPE STRAW BALE/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, STRAW BALES / OR SIMILAR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. MOBILE SILTTRUSTER SYSTEM TO BE AVAILABLE ON SITE FOR USE AS REQUIRED ALSO.
- SLEDS 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 RECEIVING WATER COURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR SWALES / DITCHES TO BE USED TO COLLECT UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS SWALES / DISCHARGE TO FIELD DITCHES WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
- DRAINAGE SWALES / DITCHES TO BE EXCAVATED ADJACENT TO THE ACCESS TRACKS. REGULAR CROSS DRAINS TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN THE SWALES / DITCHES. 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 >50M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
- BATTERS OF ALL PROPOSED SWALES / DITCHES TO HAVE A SLOPE OF BETWEEN 1:1.5 TO 1:2 DEPENDING UPON DEPTH OF SWALE/DITCH AND WILL BE LEFT AS CUT TO BE VEGETATED WITH LOCAL SPECIES.
- TRACK SIDE SWALES / DITCHES TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAMINANT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, FROM TO DISCHARGE.
- SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPEND ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING D001.
- STRAW BALES / OR SIMILAR AND SILT FENCES TO BE USED ALSO AROUND 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 WATERCOURSE WHERE WORKS COMES WITHIN 150M OF EDGE OF ANY DITCH / EPIHEMERAL CHANNELS.
- SLOPES OF THE SWALES / DITCHES 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 AND USED TO LINE SLOPES AND BASE OF SWALES / DITCHES OR LONGITUDINAL MOUNDS OF VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
- CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY SOWN / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-100MM 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 MONITORED AS PART OF AN ONGOING MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAMS TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
- SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF SWALE.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. 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.
- DIL FUEL SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.

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 ROAD/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 DRAIN WITH SILT TRAP A MINIMUM 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 TRACK SIDE DITCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
- PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN FIELD DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF DISCHARGE/DRAINAGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND OTHER SIMILAR DISCHARGE CONTROLS.
- VEGETATION WILL NOT BE STRIPPED FROM EXISTING FIELD DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.

EXCAVATIONS:

- WHERE DEEP EXCAVATIONS 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:

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

SILT TRAPS:

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

REFUELLING:

- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY. REFUELLING ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / DITCHES AND WATERCOURSES / WATERBODIES.
- SILT TRAPS 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 DISCHARGE OCCUR.
- CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE.

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

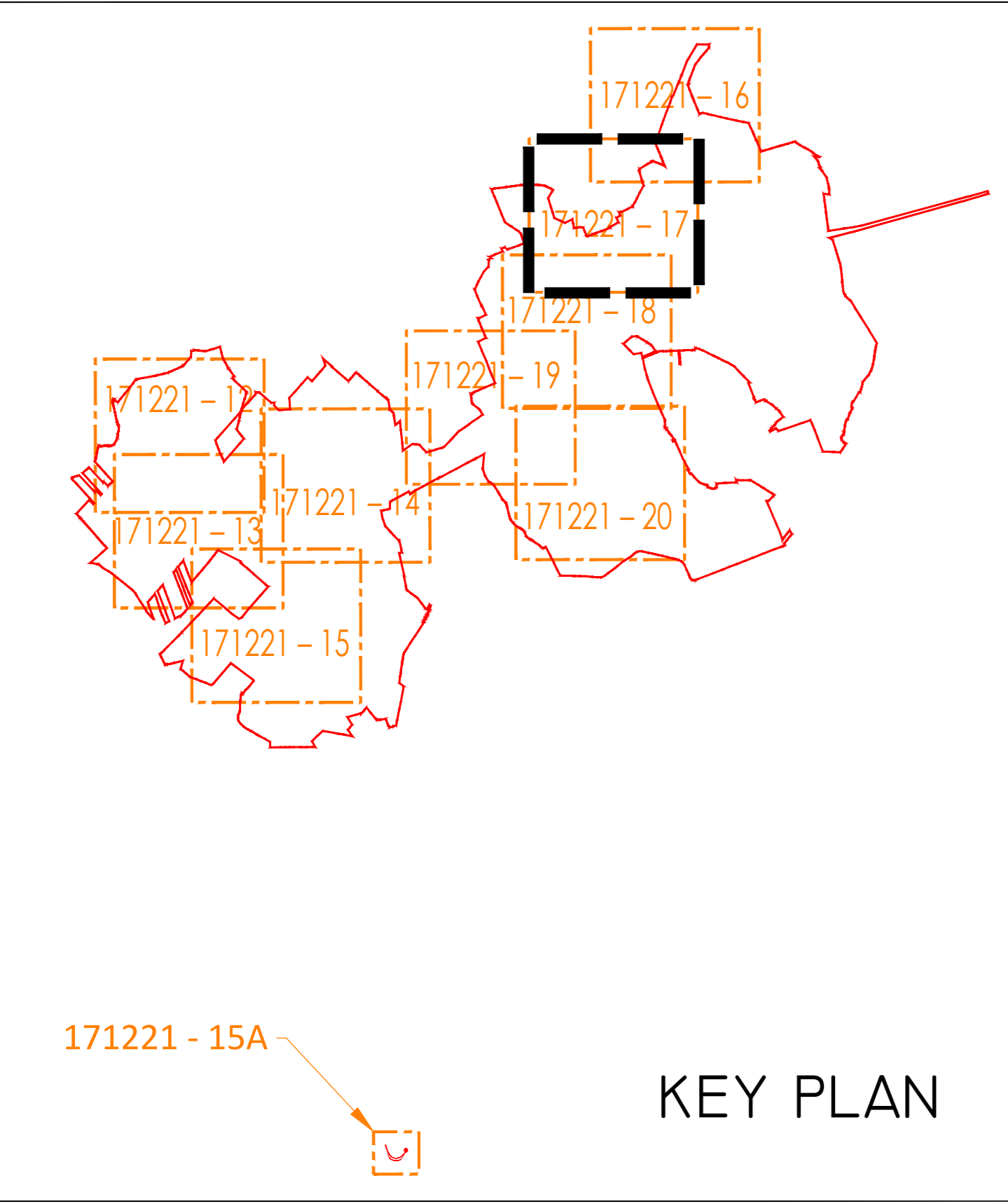
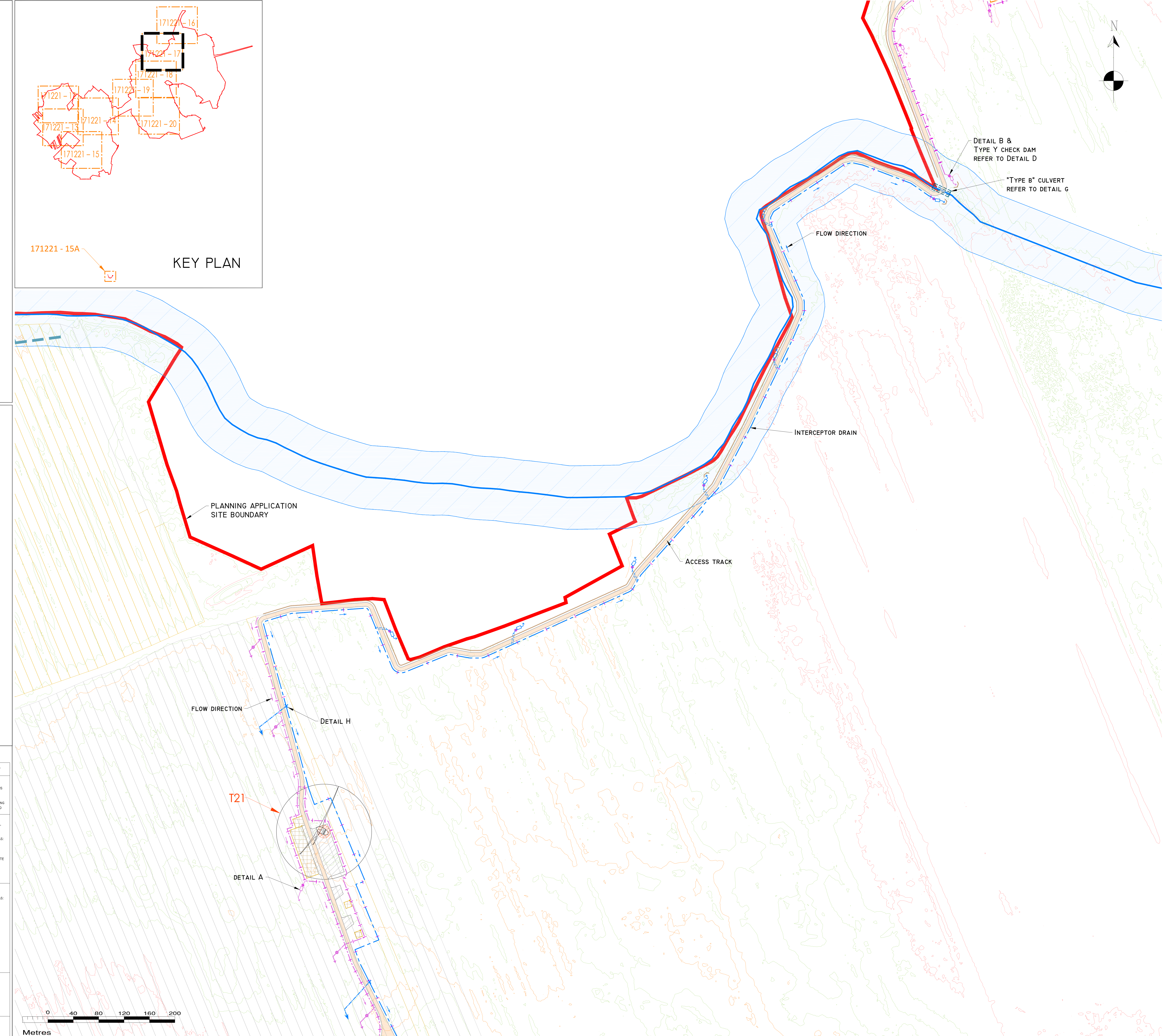
STOP - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

CONTAIN - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.

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

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 / OVERSIZED SWALES, VEE-DRAINS, DIVERSION DRAINS, FLUMES AND COLLETT PIPES. EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OSTER BAGS FILLED WITH GRAVEL FILTER FABRICS AND OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS USING SMALL WORKING AREAS COVERING STOCKPILES WEATHERING DRIP / SEALING PEAT STOCKPILES
IN-LINE CONTROLS:	<ol style="list-style-type: none"> INTERCEPTOR DRAINS, VEE-DRAINS, OVERSIZED SWALES/COLLECTOR DRAINS EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OSTER BAGS FILLED WITH GRAVEL FILTER FABRICS STRAW BALES FLOW LIMITERS WEIRS OR BAPPLERS AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. SILT FENCES, FILTER FABRICS IN STREAM SEGMENTS COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS ATTENUATION LAGOONS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS:	<ol style="list-style-type: none"> TEMPORARY SUMPS ATTENUATION PONDS TEMPORARY STORAGE LAGOONS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTTRUSTER, 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 :

- DEEP OPEN DRAINS
- PIPED DRAINS
- DIRECTION OF FLOW
- FIELD DRAINS
- SETTLEMENT PONDS (SP)
- RIVERS/STREAMS
- RIVERS/STREAMS 50M BUFFER

PROPOSED DRAINAGE

- PROPOSED CULVERT
- UPSTREAM INTERCEPTOR DITCHES
- INTERCEPTOR DITCH CULVERT
- DIRECTION OF FLOW
- SWALES/DOWNSTREAM COLLECTOR DRAIN
- COLLECTOR DITCH CULVERT
- SETTLEMENT POND - LEVEL SPREADER
- 'TYPE Y' CHECK DAM
- CHECK DAM 'TYPE Y'
- SILT FENCES

EXISTING DRAINAGE

- EXISTING GROUND SURFACE
- INTERMEDIATE CONTOUR (10 M INTERVAL)
- EXISTING GROUND SURFACE MAJOR CONTOUR (5 M INTERVAL)
- EXISTING GROUND SURFACE MINOR CONTOUR (1 M INTERVAL)
- TURBINE AND SWEEP AREA
- TURBINE FOUNDATION
- PROPOSED ROAD
- CONSTRUCTION COMPOUND
- SUBSTATION COMPOUND
- PROPOSED AMENITY LINK
- SOFT LEVELED AREA

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Date	Description	Chkd	Signed
Revisions			

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Client: **BORD NA MONA POWERGEN LTD**

Job: **DERRINLOUGH WF, CO. OFFALY**

Title: **PROPOSED DRAINAGE LAYOUT**

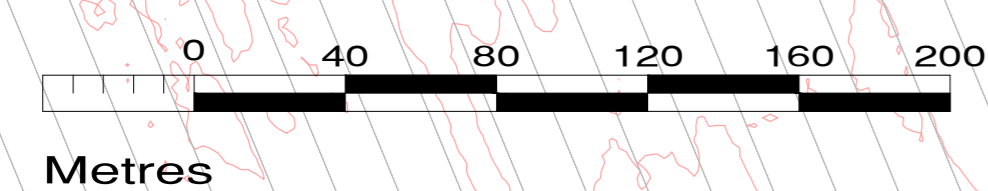
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Drawing No: P1463-0-0220-A0-171221-17-00A

Sheet Size: A0 Project No.: P1463-0

Scale: 1:2,000 (A0) Drawn By: MG / GD

Date: 14/02/2020 Checked By: MG



DRAINAGE NOTES:

- ROADWAY SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
- STRAW STRAW BALE/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 ALONG SILT FENCES, STRAW BALE / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. MOBILE SILTTRUSTER SYSTEM TO BE AVAILABLE ON SITE FOR USE AS REQUIRED ALSO.
- SLEES SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE ERECTION OF STRAW BALE/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 RECEIVING WATER COURSES. SEE NOTES ON POLLUTION PREVENTION.
- INTERCEPTOR SWALES / DITCHES TO BE USED TO COLLECT UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DITCHES WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR SWALES TO SUITABLE FIELD DRAIN OUTLET POINTS.
- DRAINAGE SWALES / DITCHES TO BE EXCAVATED ADJACENT TO THE ACCESS TRACKS. REGULAR CROSS DRAINS TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN THE SWALES / DITCHES. 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 >50M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
- BATTERS OF ALL PROPOSED SWALES / DITCHES TO HAVE A SLOPE OF BETWEEN 1:1.5 TO 1:2 DEPENDING UPON DEPTH OF SWALE/DITCH AND WILL BE LEFT AS CUT TO BE VEGETATED WITH LOCAL SPECIES.
- TRACK SIDE SWALES / DITCHES TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAMINANT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS, PRIOR TO DISCHARGE.
- SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HAND STAND AREAS. POND SIZES DEPEND ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING 0001.
- STRAW BALE / OR SIMILAR AND SILT FENCES TO BE USED ALSO AROUND 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 WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY DITCH / EMBANKMENT CHANNELS.
- SLOPES OF THE SWALES / DITCHES 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 AND USED TO LINE SLOPES AND BASES OF SWALES / DITCHES OR LONGITUDINAL BARRIERS OF VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
- AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM 15% CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY SOWN / GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-100MM CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACKS, LOW 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 MONITORED 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 CONTINGENTIAL GRADIENT OF SWALE.
- LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. 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 HANDSTAND CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
- DIL FUEL SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
- SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.

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 ROAD TRACKS, AND DISCHARGE TESTING OF DRAINING 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 A MINIMUM 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 TRACK SIDE DITCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
- PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN FIELD DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND OTHER SIMILAR DISCHARGE CONTROLS.
- VEGETATION WILL NOT BE STRIPPED FROM EXISTING FIELD DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.

EXCAVATIONS:

- WHERE DEEP EXCAVATIONS 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:

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

SILT TRAPS:

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

REMEDIATION:

- REFUELLING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REFUELLING AREAS ONLY. REFUELLING ON AN IMPERMEABLE SURFACE AND AWAY FROM FIELD DRAINS / DITCHES AND WATERCOURSES / WATERBODIES.
- DRILL SITES 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 DISCHARGE OCCUR.
- CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE.

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

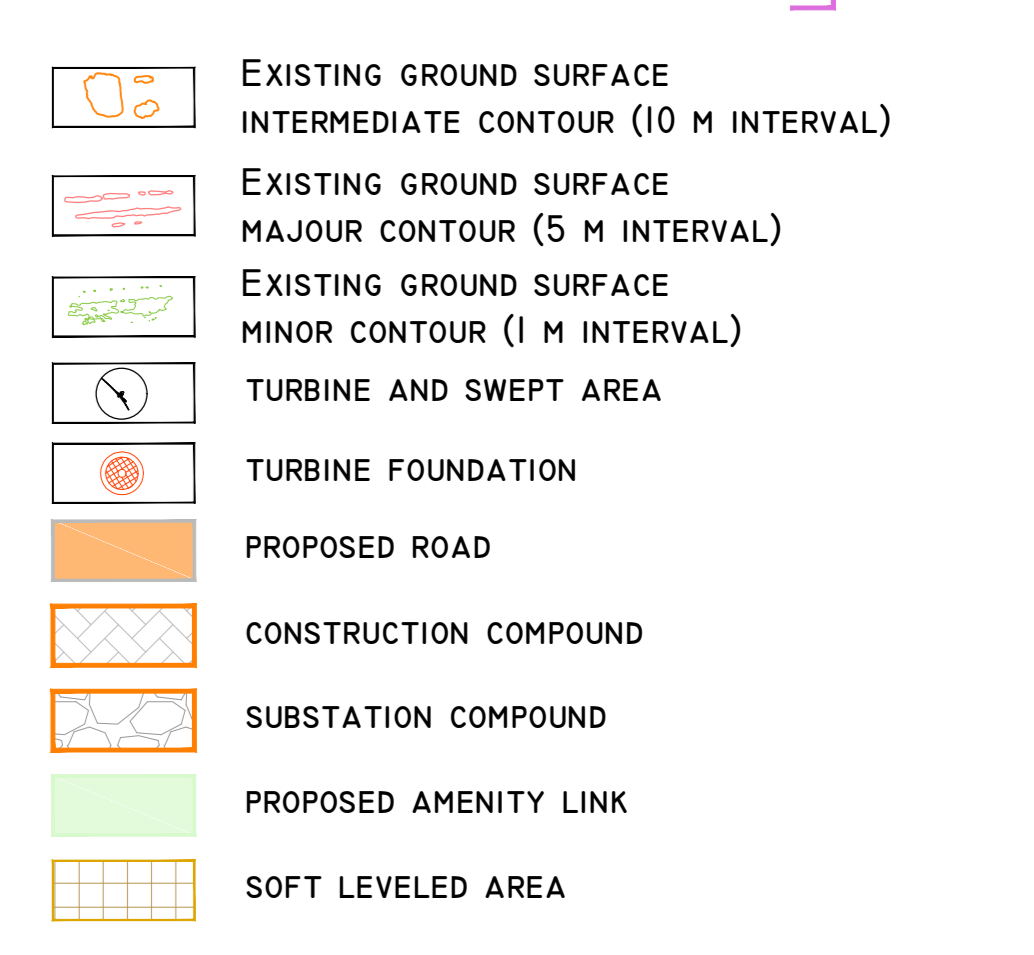
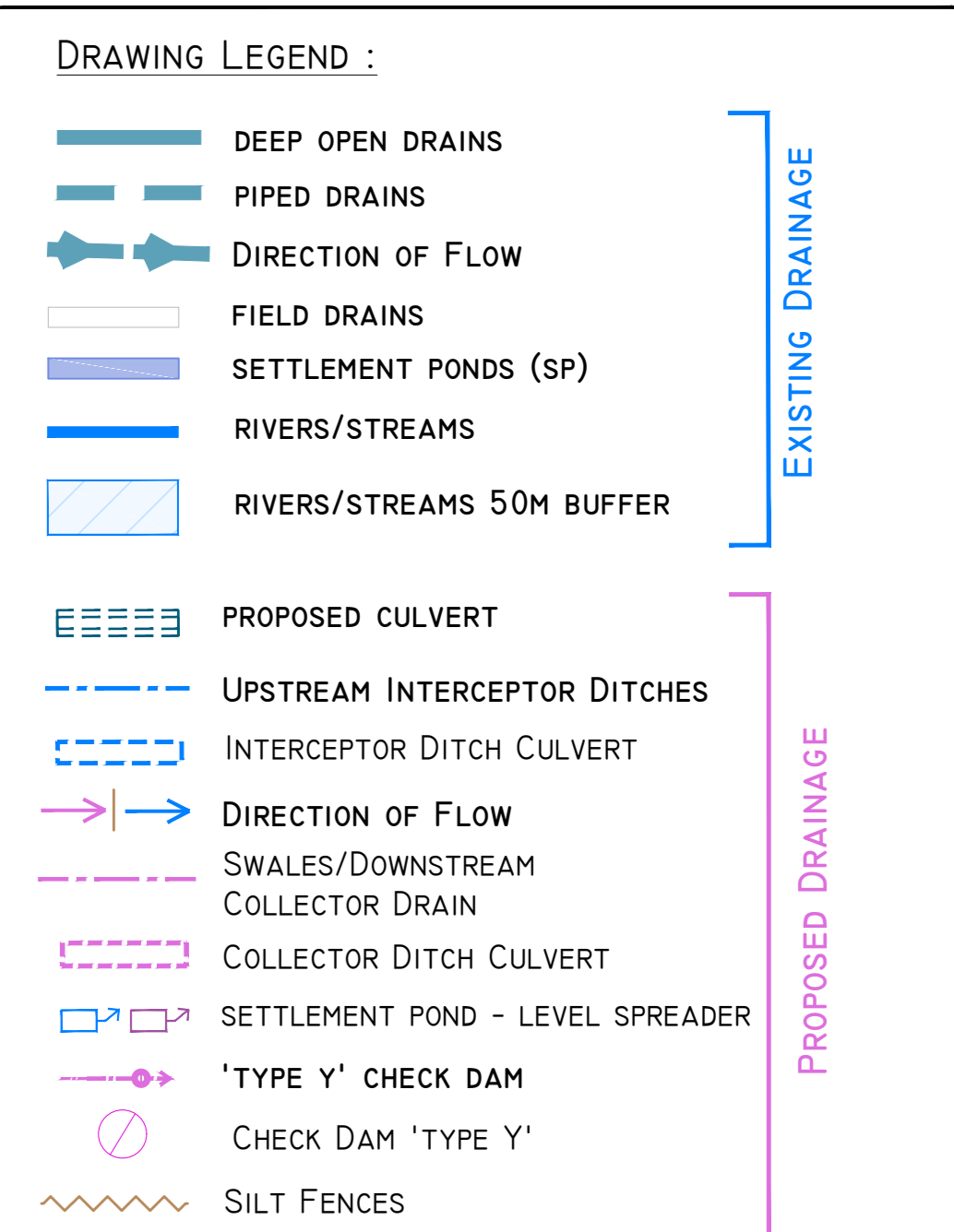
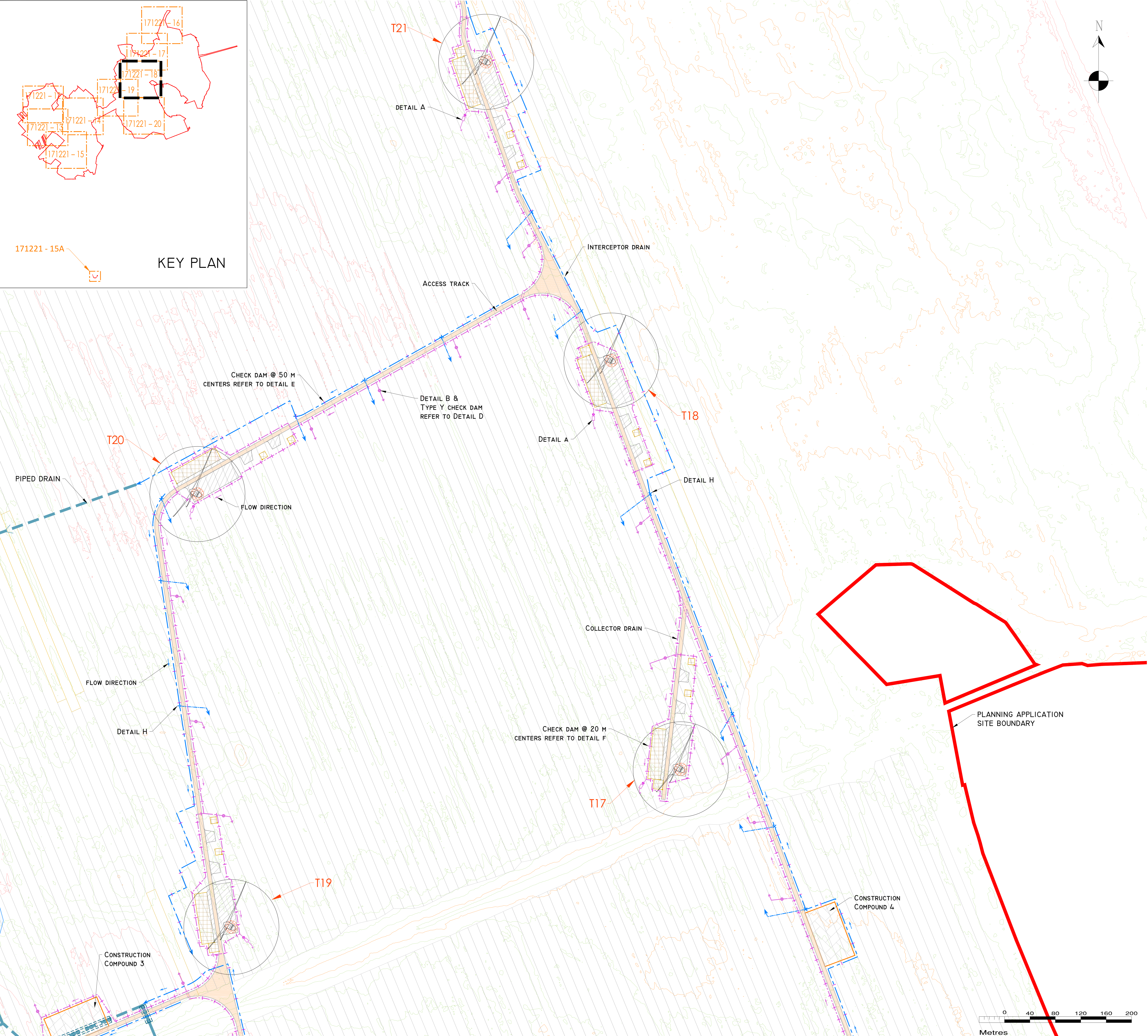
STOP - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

CONTAIN - THE SOURCE OF THE POLLUTION SHOULD BE BUNDED USING A SUITABLE METHOD. NATURAL WATERCOURSES SHOULD BE TEMPORARILY DIVERTED AROUND THE SOURCE OF POLLUTION.

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

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 DOWNTHEM COLLECTOR DRAINS / OVERSIZED SWALES, VEE-DRAINS, DIVERSION DRAINS, FLUMES AND COLLECTOR 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 COVERING STOCKPILES WEATHERING DRY / SEALING PEAT STOCKPILES
IN-LINE CONTROLS:	<ol style="list-style-type: none"> INTERCEPTOR DRAINS, VEE-DRAINS, OVERSIZED SWALES/COLLECTOR DRAINS EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> SAND BAGS OYSTER BAGS FILLED WITH GRAVEL FILTER FABRICS STRAW BALES FLOW LIMITERS WEIRS OR BAFFLES AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. SILT FENCES, FILTER FABRICS IN STREAM SEDIMENTS COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS ATTENUATION LAGOONS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS:	<ol style="list-style-type: none"> TEMPORARY SUMPS ATTENUATION PONDS TEMPORARY STORAGE LAGOONS SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTTRUSTER, 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



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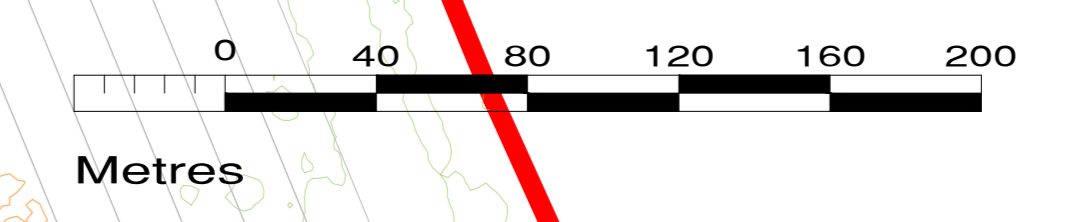
Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **171221 - 18**

Drawing No: P1463-0-0220-A0-171221-18-00A

Sheet Size: A0 Project No.: P1463-0

Scale: 1:2,000 (A0) Drawn By: MG / GD
Date: 14/02/2020 Checked By: MG



ROWWAY SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).

1. STRAW BALE/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, STRAW BALES / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. MOBILE SILTTRUSTER SYSTEM TO BE AVAILABLE ON SITE FOR USE AS REQUIRED ALSO.
2. SILT SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACKS. INTERIM MEASURES SUCH AS THE PLACEMENT OF STRAW BALE/SILT FENCING/ OR SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE EMPLOYED IN ALL INSTANCES WHERE WORK CARRIES OUT TO CONSTRUCT THE ACCESS TRACKS IS LIKELY TO CAUSE ADVERSE ENVIRONMENTAL EFFECTS THROUGH INCREASED SILT LOADINGS BEING GENERATED DURING THE CONSTRUCTION PHASE.
3. SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO RECEIVING WATER COURSES. SEE NOTES ON POLLUTION PREVENTION.
4. INTERCEPTOR SWALES / DITCHES TO BE USED TO COLLECT UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DITCHES WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
5. DRAINAGE SWALES / DITCHES TO BE EXCAVATED ADJACENT TO THE ACCESS TRACKS. REGULAR CROSS DRAINS TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN THE SWALES / DITCHES. 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 >50M TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVER LAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
7. BATTERS OF ALL PROPOSED SWALES / DITCHES TO HAVE A SLOPE OF BETWEEN 1:5 TO 1:2 DEPENDING UPON DEPTH OF SWALE/DITCH AND WILL BE LEFT AS CUT TO BE VEGETATED WITH LOCAL SPECIES.
8. TRACK SIDE SWALES / DITCHES TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAMINANT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS TO DISCHARGE.
9. SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZES DEPEND ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING D001.
10. STRAW BALES / OR SIMILAR AND SILT FENCES TO BE USED AROUND 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 WATERCOURSE WHERE WORKS COMES WITHIN 15M OF EDGE OF ANY DITCH / EMBANKMENT CHANNELS.
12. SLOPES OF THE SWALES / DITCHES 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 AND USED TO LINE SLOPES AND BASES OF SWALES / DITCHES OR LONGITUDINAL MOUNDS OF VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
13. AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
14. CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY MINIMALLY GEOLOGICALLY SIMILAR WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 20-100MM 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 MONITORED AS PART OF AN ONGOING MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAMS TO BE REMOVED AND REPLACED SUBSEQUENT TO THE REMOVAL OF SILT.
16. SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON CIRCUMSTANTIAL GRADIENT OF SWALE.
17. LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. 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. OIL FUEL SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
19. SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.

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 DEMATERING EXCAVATIONS, EROSION OF EXPOSED/DISTURBED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROAD TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINING AND DITCHES.

DISCHARGES

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 A MINIMUM 20M FROM NEAREST WATERCOURSE UNLESS OTHERWISE STATED.
2. NO EXCAVATED MATERIAL IS TO BE STORED WITHIN ANY SURFACE WATER BUFFER ZONE.
3. PUMPED WATER WILL BE DIRECTED INTO TRACK SIDE DITCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
4. FLOWING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN FIELD DRAINS/DITCHES/STREAMS WILL BE COMPLETED IN A MANNER THAT DOES NOT CAUSE SCOUR OR EROSION AT THE POINT OF RE-RELEASE/DISCHARGE. THIS WILL BE DONE BY REDUCING THE FLOW VELOCITIES OR BY USE OF SPLASH PLATES, AND OTHER SIMILAR DISCHARGE CONTROLS.
5. VEGETATION WILL NOT BE STRIPPED FROM EXISTING FIELD DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.

EXCAVATIONS

1. WHERE DEEP EXCAVATIONS 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

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

SILT TRAPS

1. USE OF TRACK SIDE SWALES WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
2. CHECK DAMS TO BE INSPECTED AND CLEANED REGULARLY.

REVEALING

1. REVEALING OF MOBILE PLANT WILL BE COMPLETED IN DESIGNATED REVEALING AREAS ONLY. RESTRICTIONS ON AN IMPROVABLE SURFACE AND AWAY FROM FIELD DRAINS / DITCHES AND WATERCOURSES / WATERBODIES.
2. DRILL BITS AND SHIP TRAYS WILL BE AVAILABLE ON SITE FOR USE AS REQUIRED.

CONCRETE

1. CARE WILL BE TAKEN WHEN COMPLETING CONCRETE WORKS ON SITE TO ENSURE NO DISCHARGES OCCUR.
2. CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE.

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

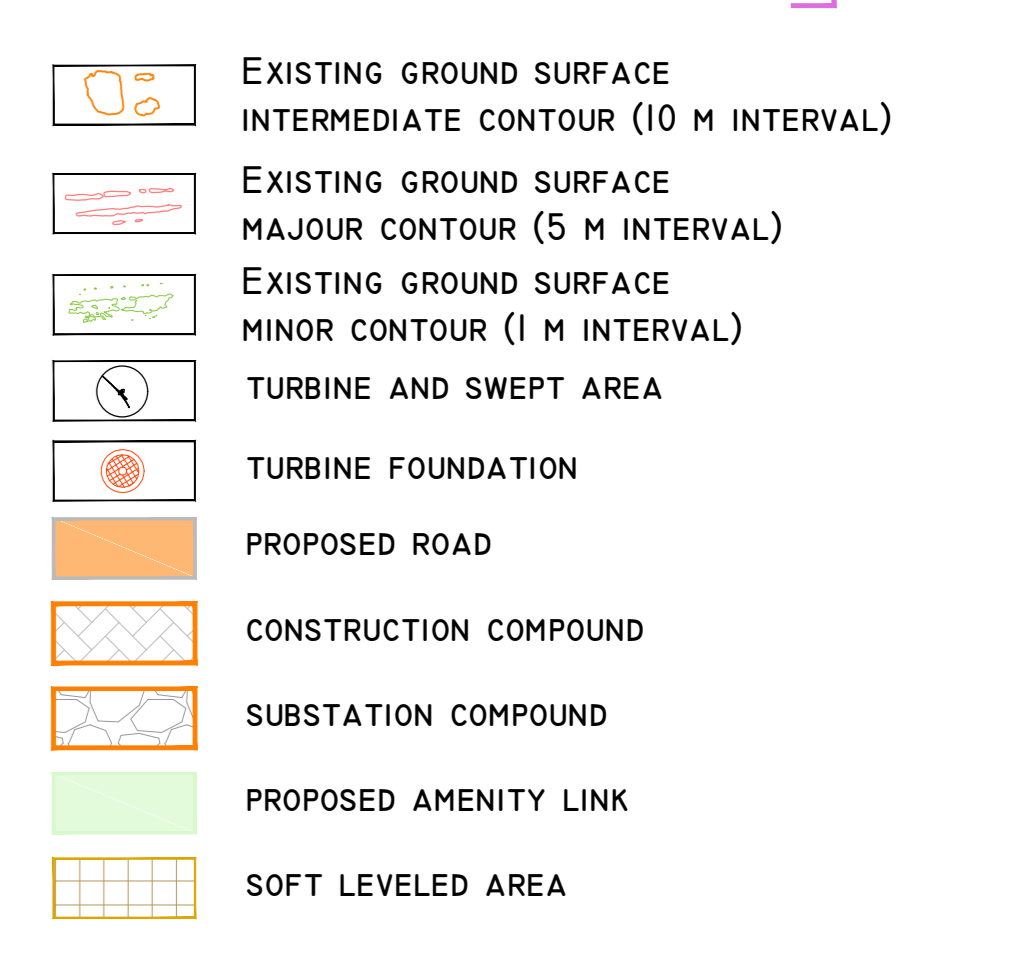
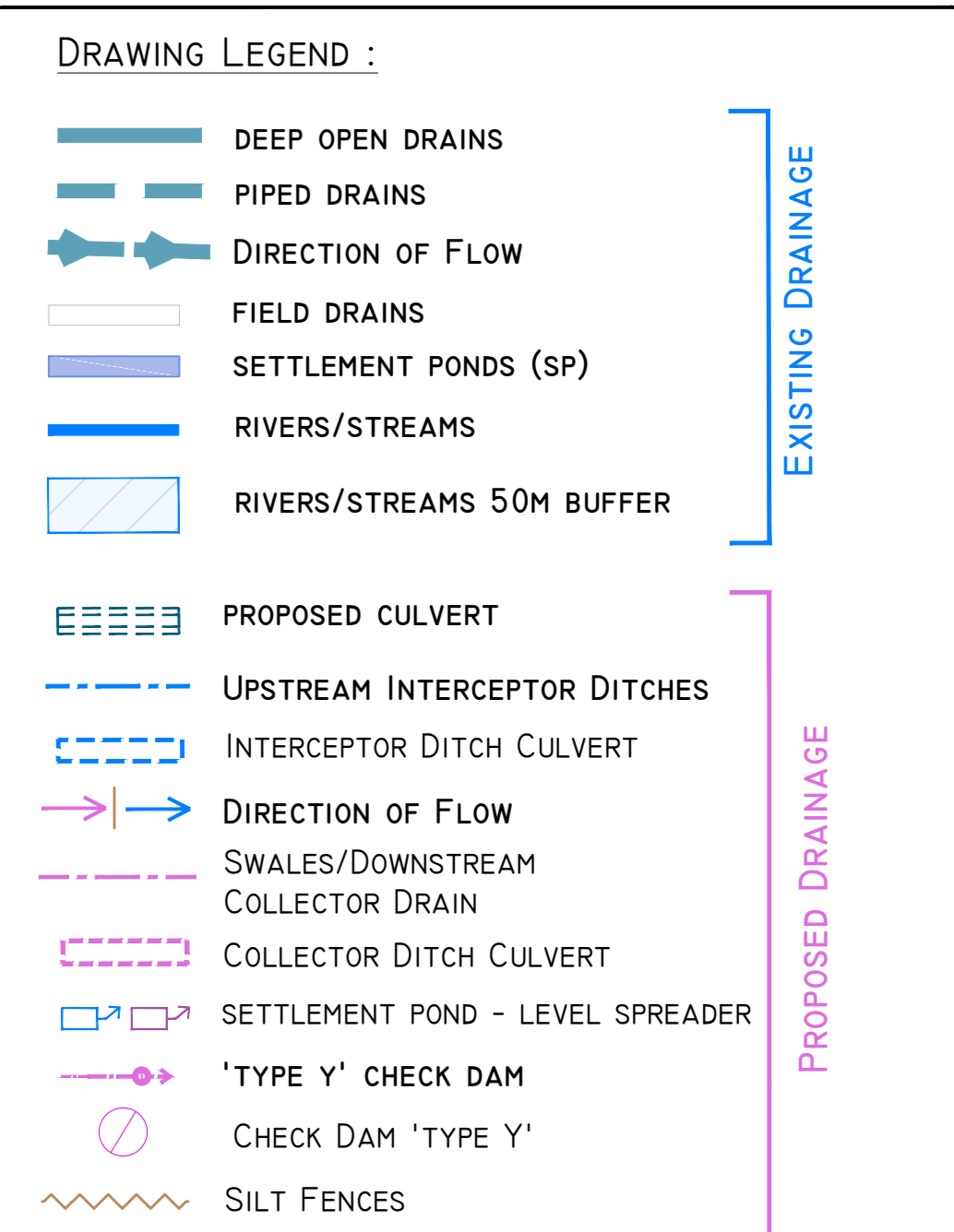
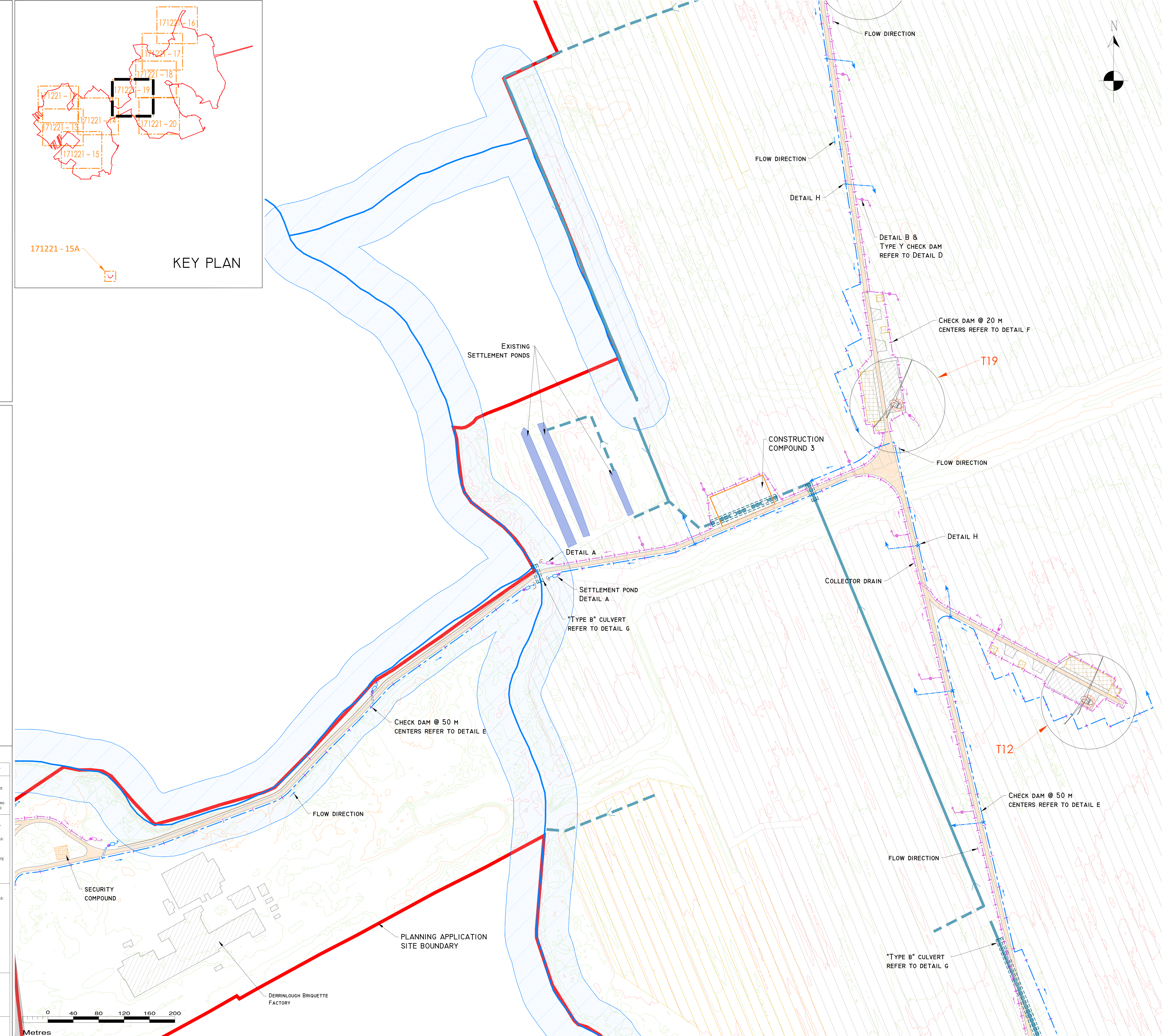
STOP - WORK IN THE IMMEDIATE AREA SHOULD BE STOPPED AND THE SOURCE OF THE POLLUTION IDENTIFIED.

CONTAIN - THE SOURCE OF THE POLLUTION SHOULD BE RAISED USING A SUITABLE METHOD. 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.

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"> 1) APPLICATION OF 50M BUFFER ZONES TO NATURAL WATERCOURSES WHERE POSSIBLE. 2) APPLICATION OF 10M BUFFER ZONES TO MAIN DRAINS WHERE POSSIBLE.
SOURCE CONTROLS	<ol style="list-style-type: none"> 1) USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS / OVERSIZED SWALES, VEE-DRAINS, DIVERSION DRAINS, FLUMES AND COLLECTOR PIPES. 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> a) SAND BAGS b) OYSTER BAGS FILLED WITH GRAVEL c) FILTER FABRICS d) AND OTHER SIMILAR/EQUIVALENT ON APPROPRIATE SYSTEMS 3) USING SMALL WORKING AREAS 4) WORKING IN APPROPRIATE WEATHER, AND SUSPENDING CERTAIN WORK ACTIVITIES IN ADVANCE OF FORECASTED WEATHER
IN-LINE CONTROLS	<ol style="list-style-type: none"> 1) INTERCEPTOR DRAINS, VEE-DRAINS, OVERSIZED SWALES/COLLECTOR DRAINS 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: <ol style="list-style-type: none"> a) SAND BAGS b) OYSTER BAGS FILLED WITH GRAVEL c) FILTER FABRICS d) STRAW BALES e) FLOW LIMITERS f) WEIRS OR BAFFLES g) AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. 3) SILT FENCES, FILTER FABRICS 4) IN STREAM SEDIMENTS 5) COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS 6) ATTENUATION LAGOONS 7) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS	<ol style="list-style-type: none"> 1) TEMPORARY SUMPS 2) ATTENUATION PONDS 3) TEMPORARY STORAGE LAGOONS 4) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS 5) PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTTRUSTER, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS. 6) SALT DEMATERING BAGS
OUTFALL CONTROLS	<ol style="list-style-type: none"> 1) LEVELSPREADERS 2) BUFFERED OUTFALLS 3) VEGETATION FILTERS 4) SALT DEMATERING BAGS 5) FLOW LIMITERS AND WEIRS



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Job: **DERRINLOUGH WF, CO. OFFALY**

Title: **PROPOSED DRAINAGE LAYOUT**

Figure No: **171221 - 19**

Drawing No: P1463-0-0220-A0-171221-19-00A

Sheet Size: A0 Project No.: P1463-0

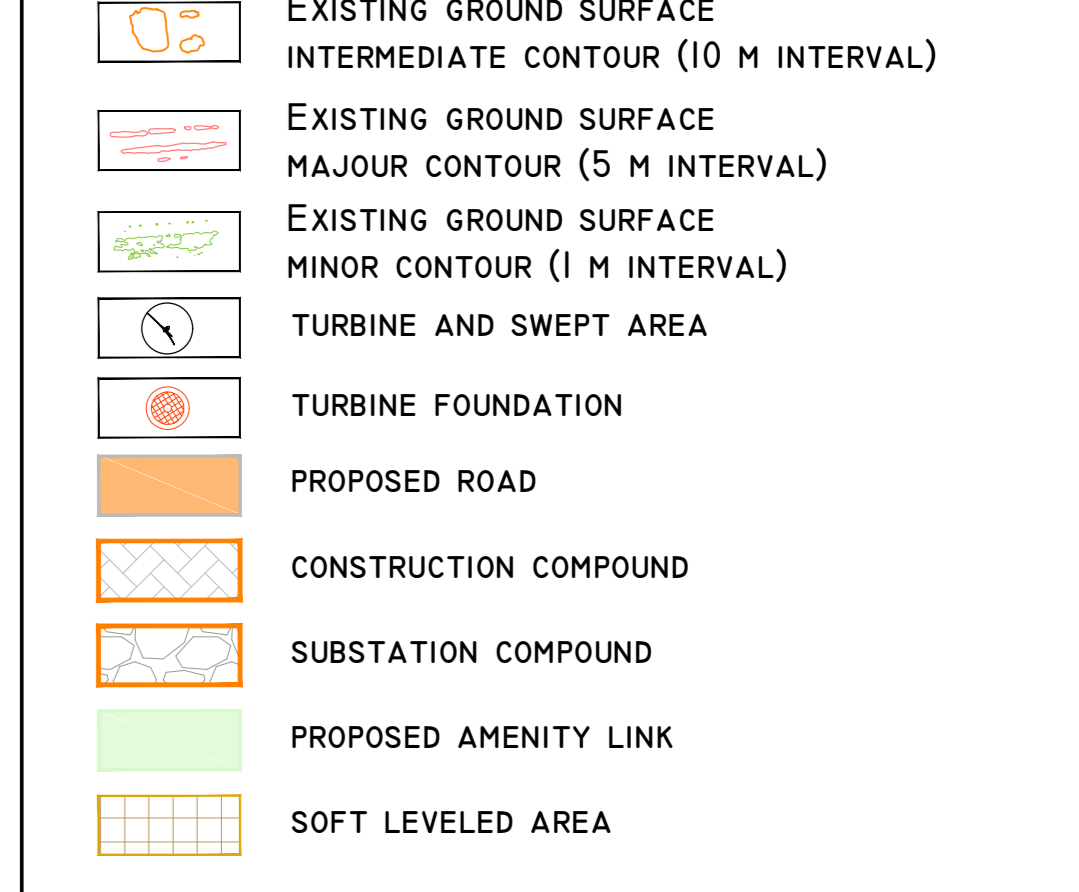
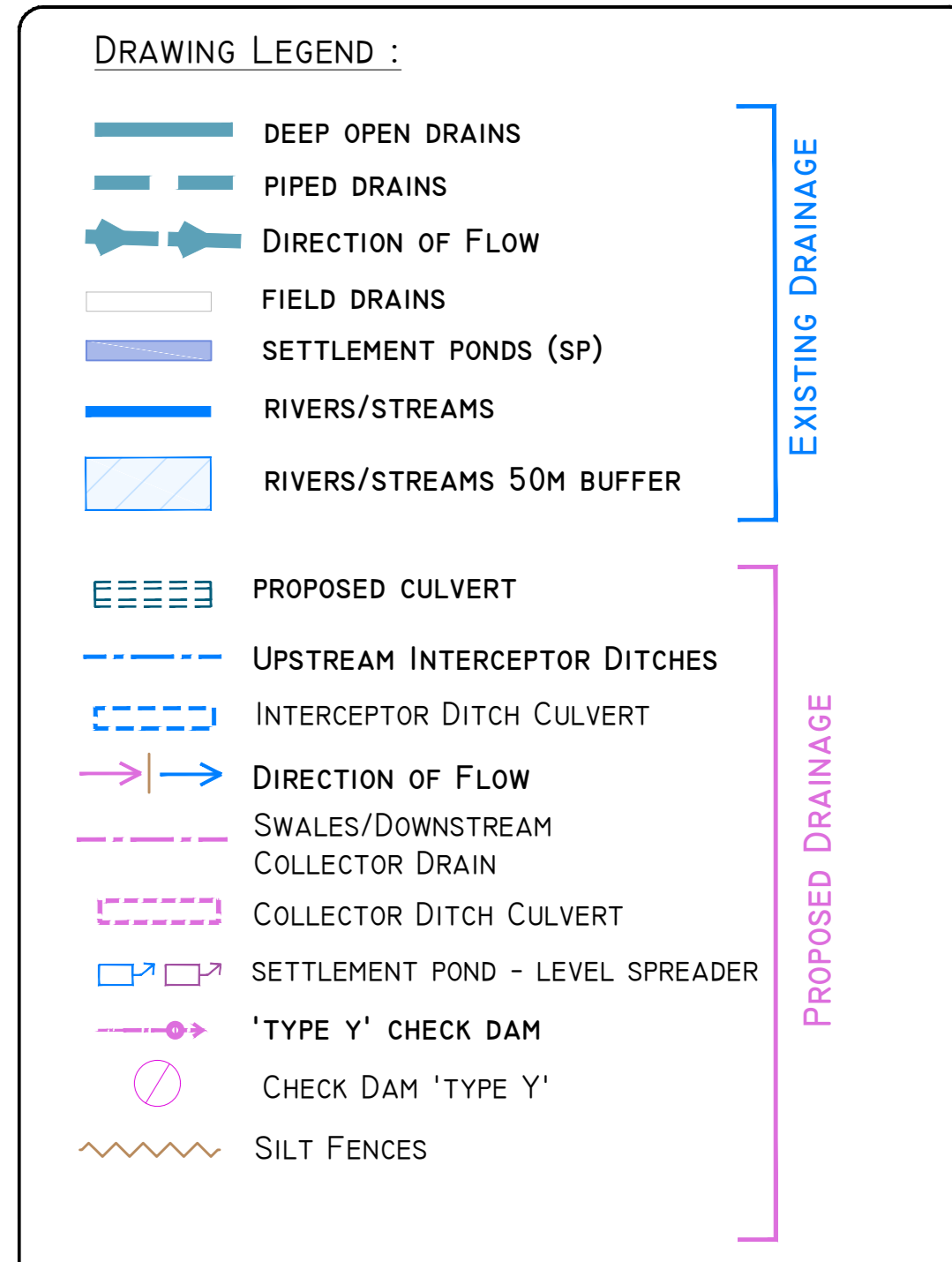
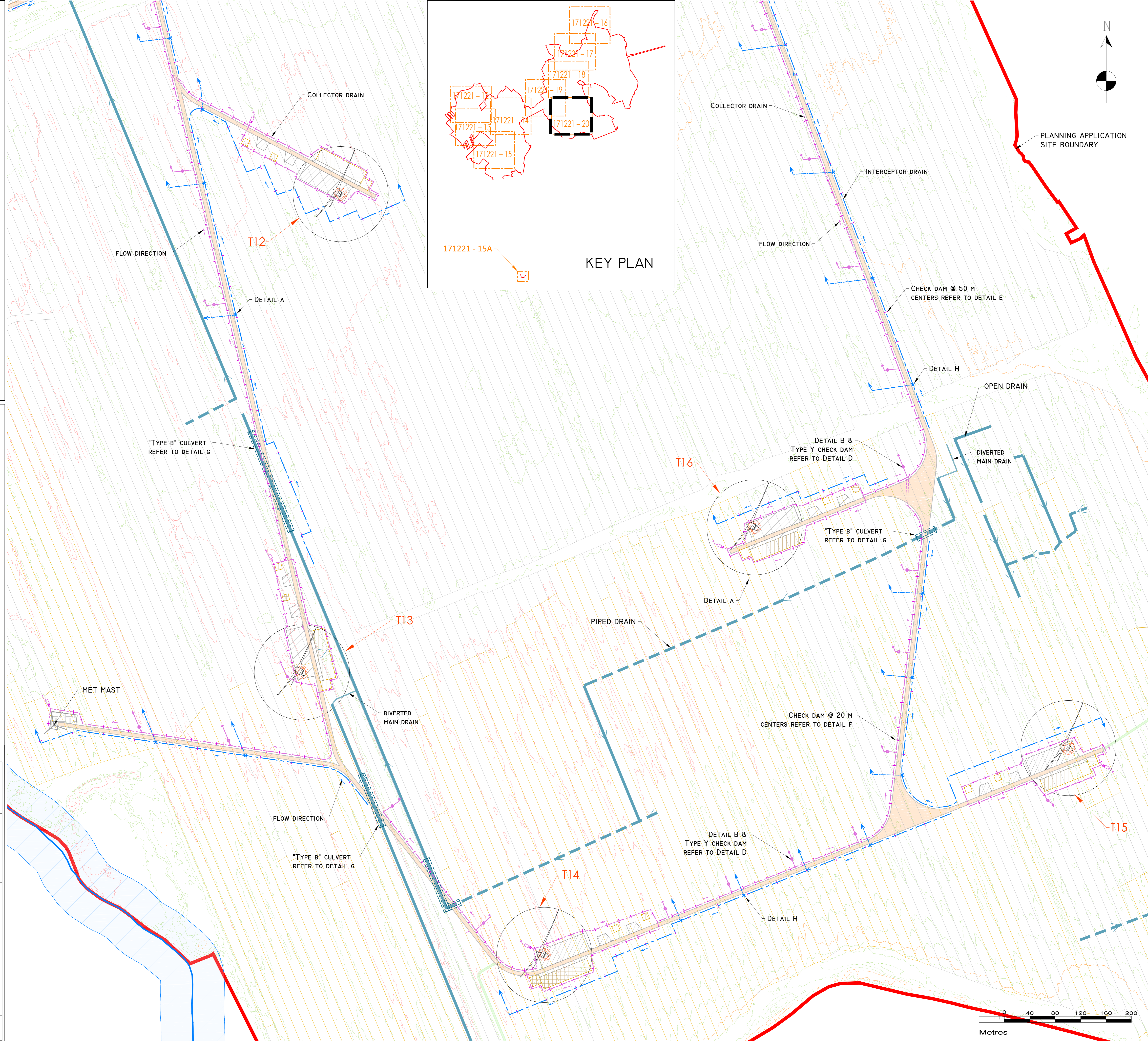
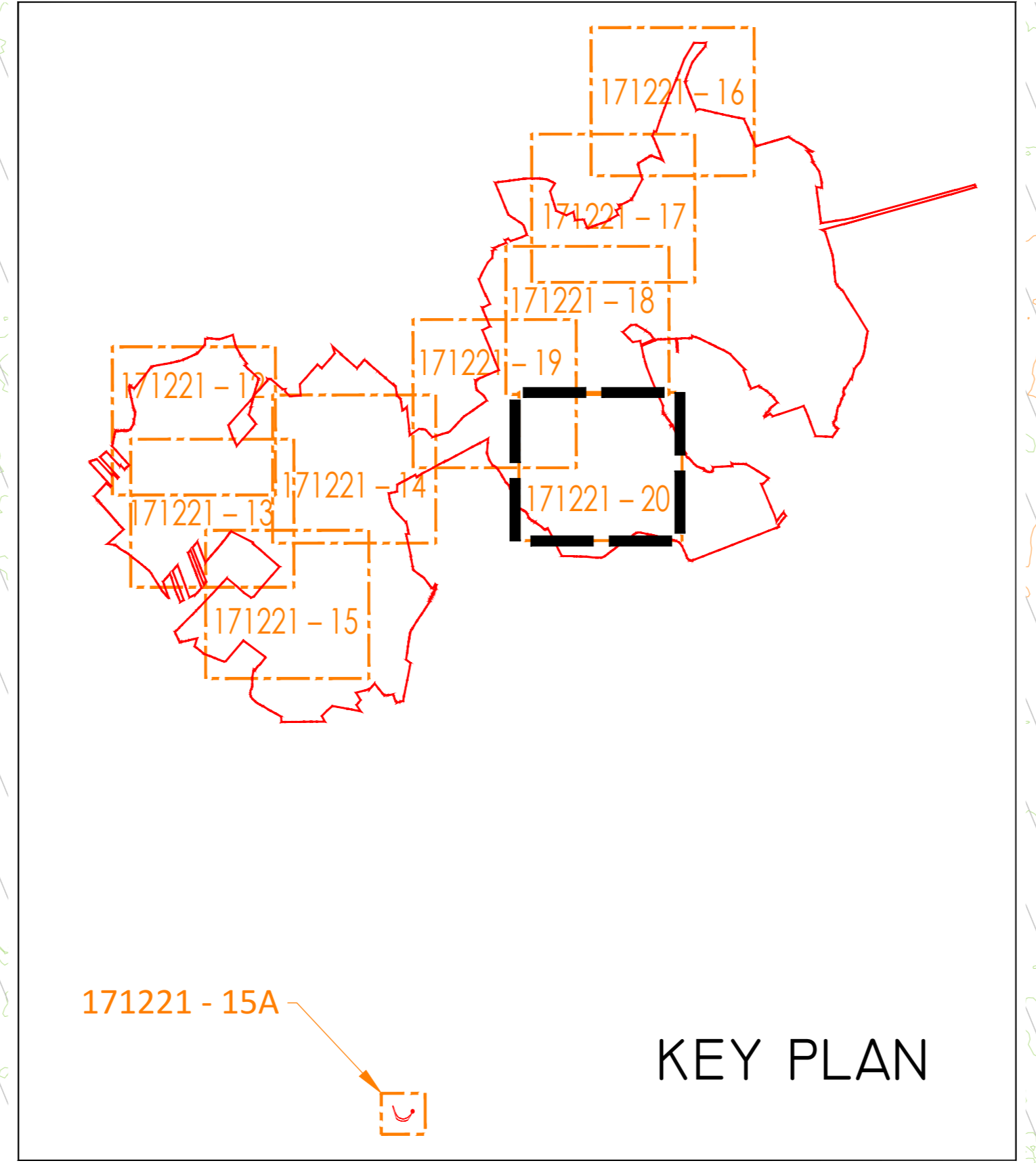
Scale: 1:2,000 (A0) Drawn By: MG / GD
Date: 14/02/2020 Checked By: MG

DRAINAGE NOTES:
ROADWAY SURFACING DESIGN AND CONSTRUCTION TO ENGINEER'S SPECIFICATION (I.E. BY OTHERS).
1. SHALE STRAIN BALE/SILT FENCINGS 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 RAISING SILT FENCES, STRAIN BALES / OR SIMILAR OR ADDITIONAL CHECK DAMS AT THE PROBLEM AREAS. MOBILE SILTSTRETCH SYSTEM TO BE AVAILABLE ON SITE FOR USE AS REQUIRED ALSO.
2. SLEES SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS ACCESS TRACKS. INTERIOR HEADINGS SUCH AS THE PLACEMENT OF STRAIN BALES/SILT FENCINGS/SIMILAR APPROVED METHOD OR ADDITIONAL CHECK DAMS AND SILT FENCES TO BE APPLIED 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.
3. SUITABLE PREVENTION MEASURES SHOULD BE IN PLACE AT ALL TIMES TO PREVENT THE CONVEYANCE OF SIGNIFICANT VOLUMES OF SILT TO RECEIVING WATER COURSES. SEE NOTES ON POLLUTION PREVENTION.
4. INTERCEPTOR SWALES / DITCHES TO BE USED TO COLLECT UPSTREAM SURFACE WATER FLOWS. REGULAR CROSS DRAINS / DISCHARGE TO FIELD DITCHES WILL BE REQUIRED TO TRANSFER / DISCHARGE SURFACE WATER IN INTERCEPTOR DRAINS TO SUITABLE FIELD DRAIN OUTFALL POINTS.
5. DRAINAGE SWALES / DITCHES TO BE CONSTRUCTED ADJACENT TO THE ACCESS TRACKS. REGULAR CROSS DRAINS TO BE LOCATED ALONG ACCESS TRACKS TO PREVENT EXCESSIVE VOLUMES OF WATER COLLECTING IN THE SWALES / DITCHES. 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 $>50m$ TO ANY EXISTING WATERCOURSE WILL BE REQUIRED WHERE OVERLAND DISCHARGES ARE PROPOSED FROM ACCESS TRACK SWALES / DITCHES.
7. BATTERS OF ALL PROPOSED SWALES / DITCHES TO HAVE A SLOPE OF BETWEEN 1:5 TO 1:2 DEPENDING UPON DEPTH OF SWALE/DITCH AND WILL BE LEFT AS OUT TO BE REVEGETATED WITH LOCAL SPECIES.
8. TRACK SIDE SWALES / DITCHES TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAMINANT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS. PRIOR TO DISCHARGE.
9. SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZE DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING D001.
10. STRAIN BALES / OR SIMILAR AND SILT FENCES TO BE USED ALSO AROUND SPILL 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 WATERCOURSE WHERE WORKS COMES WITHIN $<5m$ OF EDGE OF ANY DITCH / PERIPHERAL CHANNELS.
12. SLOPES OF THE SWALES / DITCHES 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 AND USED TO LINE SLOPES AND BASES OF SWALES / DITCHES OR LONGITUDINAL MOUNDS OF VEGETATION SWALES AT FIELD DRAIN DISCHARGE POINTS.
13. AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM 1:5 TO 1:2 DEPENDING UPON DEPTH OF SWALE/DITCH AND WILL BE LEFT AS OUT TO BE REVEGETATED WITH LOCAL SPECIES.
14. TRACK SIDE SWALES / DITCHES TO BE SHALLOW WITH MODERATE GRADIENTS TO PREVENT SCOURING. IN STEEP AREAS CHECK DAMS SHOULD BE INSTALLED TO REDUCE FLOW VELOCITIES AND PROVIDE SOURCE CONTROL OF SILT CONTAMINANT. WHERE NECESSARY THESE HAVE BEEN DESIGNATED IN CONJUNCTION WITH SETTLEMENT PONDS AND SILT TRAPS. PRIOR TO DISCHARGE.
15. SETTLEMENT PONDS TO BE CONSTRUCTED FOR SILT REMOVAL AT TURBINE BASES AND HARD STAND AREAS. POND SIZE DEPENDS ON CATCHMENT AREA SERVED. SAMPLE POND SIZES SHOWN ON DRAWING D001.
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19. AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM 1:5 TO 1:2 DEPENDING UPON DEPTH OF SWALE/DITCH AND WILL BE LEFT AS OUT TO BE REVEGETATED WITH LOCAL SPECIES.
20. CLEAN STONE FLOW CONTROL CHECK DAMS TO BE MADE OF LOCALLY AVAILABLE 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 10cm STONE ON THE DOWNHILL FACE OF THE CHECK DAM AND BY WRAPPING IN GEOTEXTILE.
21. SLOPE 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 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.
22. SPACING AND FREQUENCY OF CHECK DAMS WILL BE DEPENDENT UPON LONGITUDINAL GRADIENT OF SWALE.
23. LOCATION OF FILTRATION CHECK DAMS (IF REQUIRED) TO BE AGREED ON SITE WITH ENGINEER. 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.
24. DIESEL FUEL SHOULD BE STORED WITHIN BUNDED CONTAINMENT STRUCTURES.
25. SILT BAGS WILL BE USED ON SITE AT FIELD DRAIN DISCHARGE LOCATIONS, AS NECESSARY.

POLLUTION PREVENTION NOTES:
1. SITE MANAGEMENT PROPOSALS ARE INTENDED TO ENSURE PROTECTION AGAINST SURFACE WATER AND EROSION/ACCELERATED 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 DRAINING EXCAVATIONS, EROSION OF EXPOSED/TEMPERED GROUND, TEMPORARY STOCKPILES, PLANT AND WHEEL WASH, SITE ROAD/TRACKS, AND DISTURBANCE OF EXISTING FIELD DRAINS AND DITCHES.
4. WATERS 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 A MINIMUM 50m 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 TRACK SIDE DITCHES AND TREATED IN SETTLEMENT PONDS AND VEGETATION SWALES PRIOR TO OVERLAND DISCHARGE.
7. PUMPING OF CLEAN WATER FROM EXCAVATIONS / OR OVER-PUMPING IN FIELD 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 OTHER SIMILAR DISCHARGE CONTROLS.
8. VEGETATION WILL NOT BE STRIPPED FROM EXISTING FIELD DRAINS/DITCHES UNLESS ABSOLUTELY NECESSARY.
EXCAVATION:
9. WHERE DEEP EXCAVATIONS ARE PROPOSED CUT-OFF DRAINS WILL BE USED TO REDUCE THE AMOUNT OF SURFACE WATER ENTERING THE EXCAVATION. THIS WILL BE CASE AROUND TURBINE BASE EXCAVATIONS.
EXPOSED GROUND & STOCKPILES:
10. 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 SWALES WITH CHECK DAMS, AND/OR FILTRATION CHECK DAMS WILL REDUCE SILT IN RUNOFF WATER AS REQUIRED.
12. CHECK DAMS 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 / DITCHES AND WATERCOURSES / WATERBODIES.
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 PREVENT NO DISCHARGE ESCAPE.
16. CONCRETE WASH WATER, AND WASTE CONCRETE WILL BE MANAGED APPROPRIATELY ON SITE.
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. 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.

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 MET WEATHER
SOURCE CONTROLS:	1) USE OF UPSTREAM INTERCEPTOR DRAINS AND DOWNSTREAM COLLECTOR DRAINS / OVERSIZED SWALES, VEGETATION, DIVERSION DRAINS, FLUMES AND SILVERT PILES 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) COVERING STOCKPILES 5) WEATHERING OFF / SEALING PEAT STOCKPILES
IN-LINE CONTROLS:	1) INTERCEPTOR DRAINS, VEE-DRAINS, OVERSIZED SWALES/COLLECTOR DRAINS 2) EROSION AND VELOCITY CONTROL MEASURES SUCH AS: a) SAND BAGS b) OYSTER BAGS FILLED WITH GRAVEL c) FILTER FABRICS d) STRAIN BALES e) FLOW LIMITERS f) WEIRS OR BATTERS g) AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 3) SILT FENCES, FILTER FABRICS 4) IN STREAM SEDIMENTS 5) COLLECTION SUMPS, TEMPORARY SUMPS, PUMPING SYSTEMS 6) ATTENUATION LAGOONS 7) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS
WATER TREATMENT CONTROLS:	1) TEMPORARY SUMPS 2) ATTENUATION PONDS 3) TEMPORARY STORAGE LAGOONS 4) SEDIMENT TRAPS, STILLING / SETTLEMENT PONDS 5) PROPRIETARY SETTLEMENT SYSTEMS SUCH AS SILTSTRETCH, AND/OR OTHER SIMILAR/EQUIVALENT OR APPROPRIATE SYSTEMS 6) SILT DENATURING BAGS
OUTFALL CONTROLS:	1) LEVELSPREADERS 2) BUFFERED OUTFALLS 3) VEGETATION FILTERS 4) SILT DENATURING BAGS 5) FLOW LIMITERS AND WEIRS



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4. ALL DIMENSIONS ARE IN METRES.

Date	Description	Chkd	Signed

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Date	Description	Chkd	Signed

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Client: BORD NA MONA POWERGEN LTD

Job: DERRINLOUGH WF, CO. OFFALY

Title: PROPOSED DRAINAGE LAYOUT

Figure No: 171221 - 20

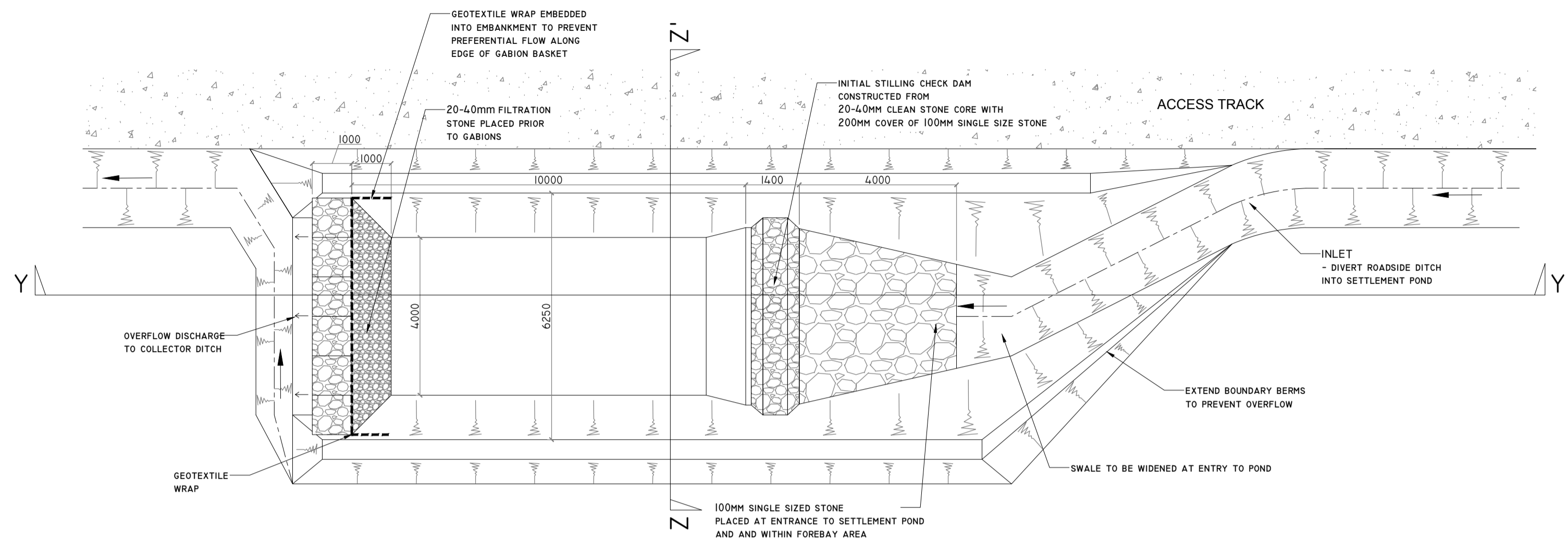
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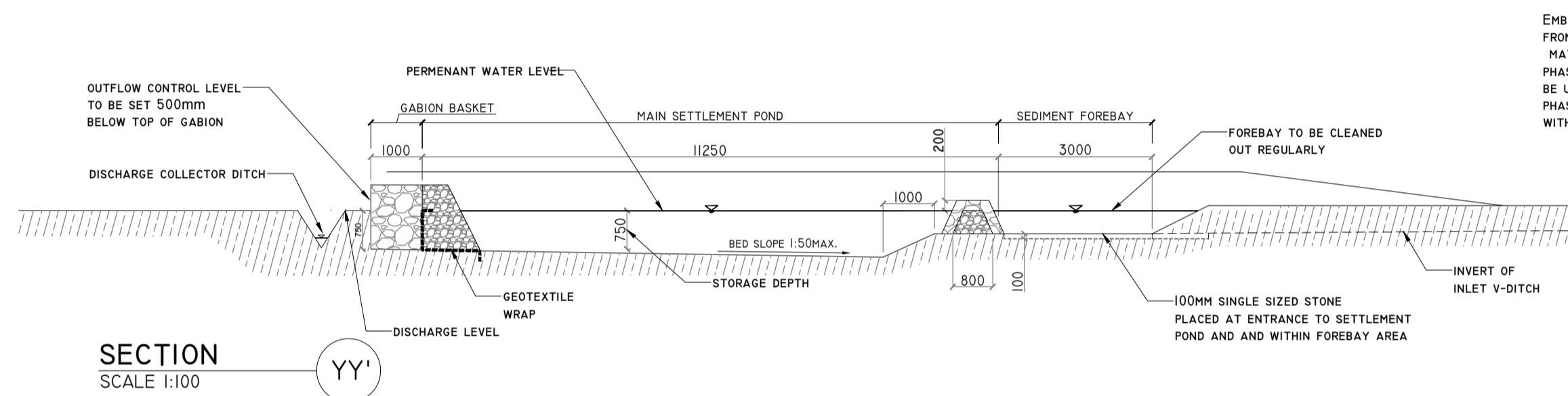
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Date: 14/02/2020 | **Checked By:** MG

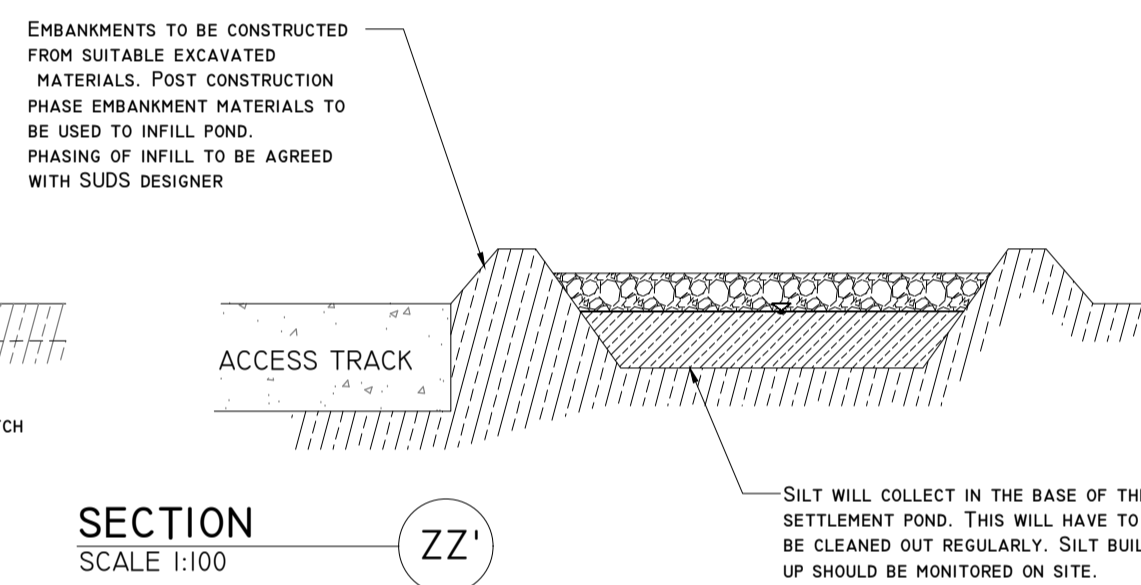
DETAIL A



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



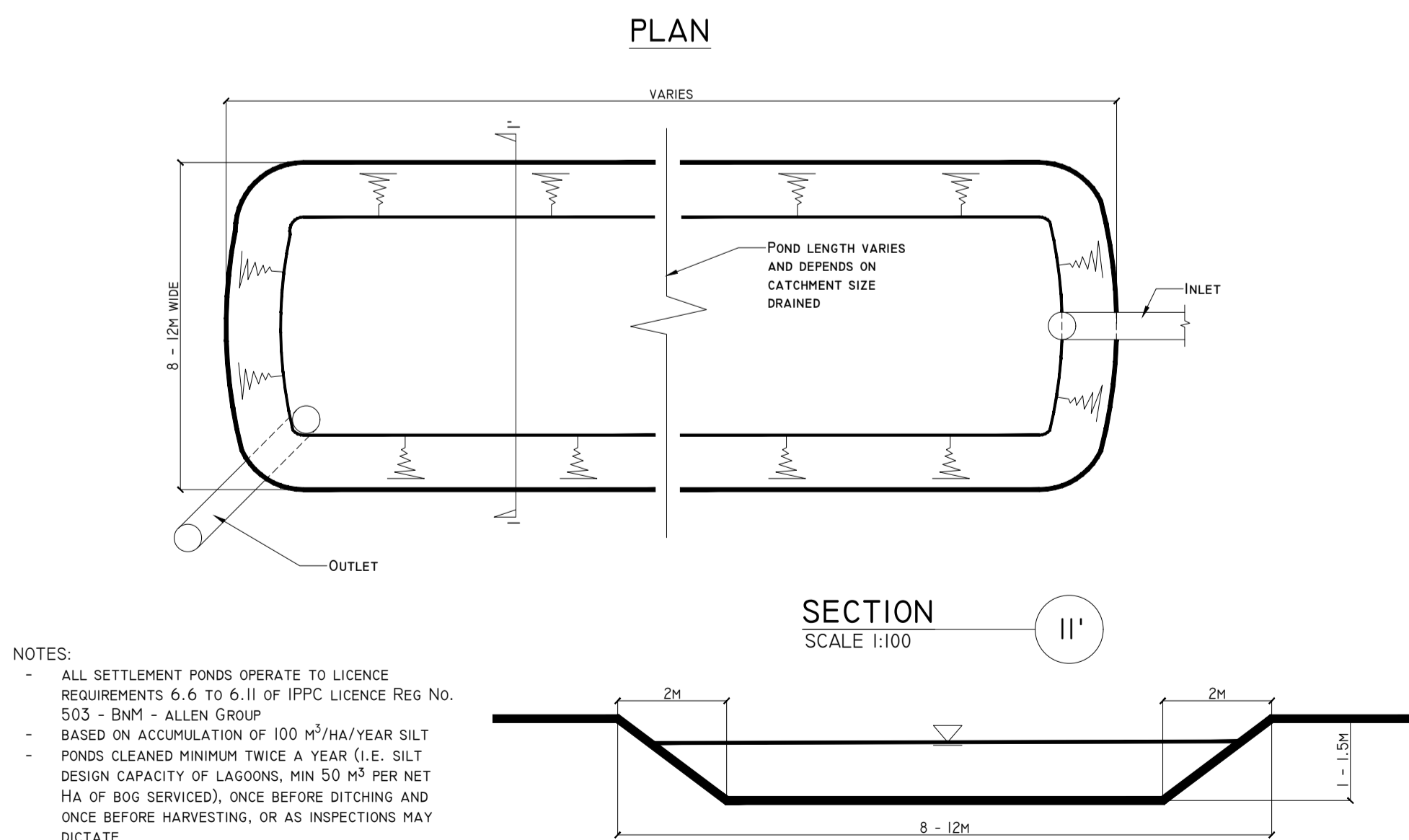
SECTION YY'
SCALE 1:100



SECTION ZZ'
SCALE 1:100

DETAIL C

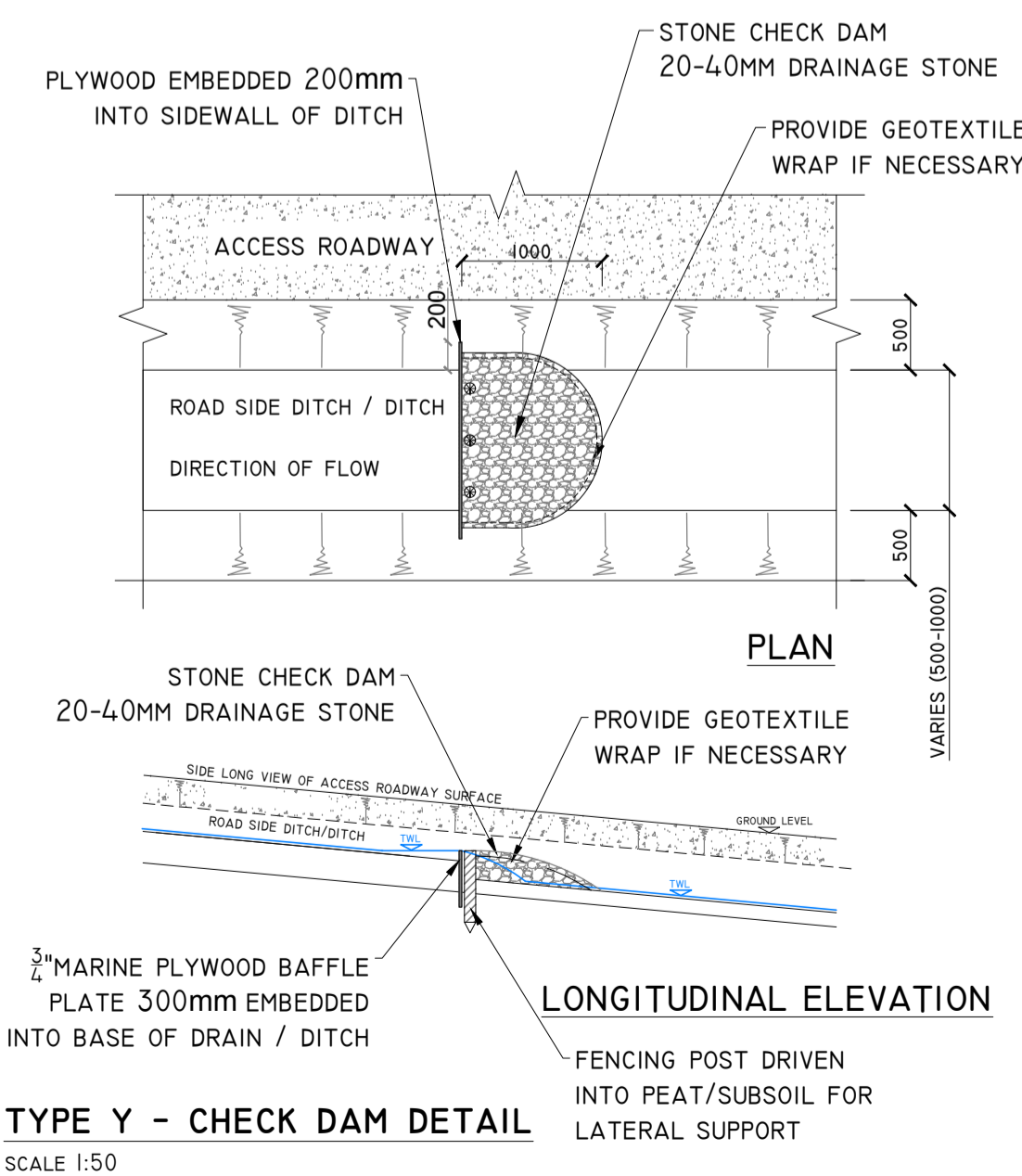
TYPICAL BNM SETTLEMENT POND DETAIL
SCALE 1:200



- NOTES:**
- ALL SETTLEMENT PONDS OPERATE TO LICENCE REQUIREMENTS 6.6 TO 6.11 OF IPPC LICENCE REG NO. 503 - BNM - ALLEN GROUP
 - BASED ON ACCUMULATION OF 100 M³/HA/YEAR SILT PONDS CLEANED MINIMUM TWICE A YEAR (I.E. SILT DESIGN CAPACITY OF LAGOONS, MIN 50 M³ PER NET HA OF BOG SERVICES), 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

SECTION II'
SCALE 1:100

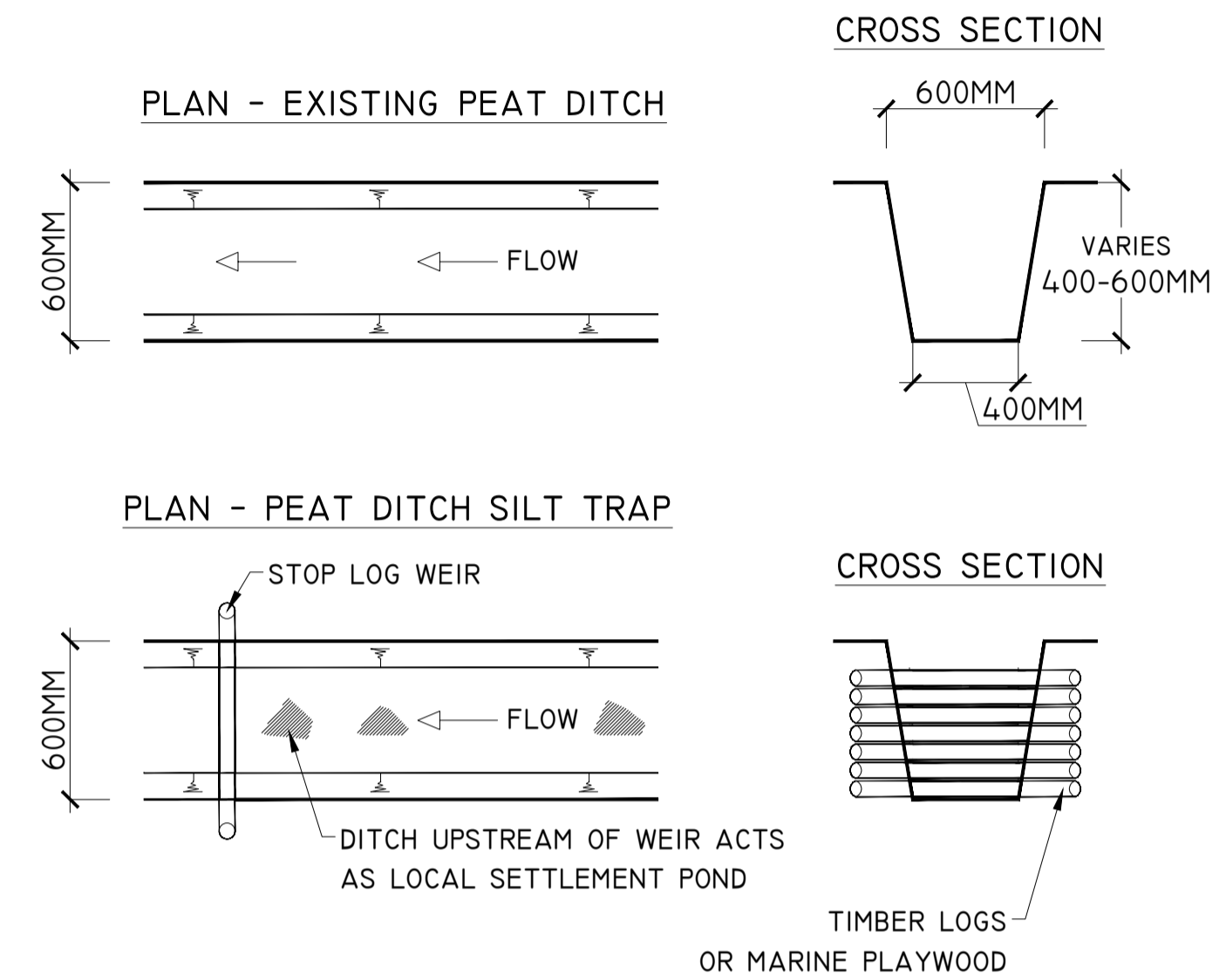
DETAIL D



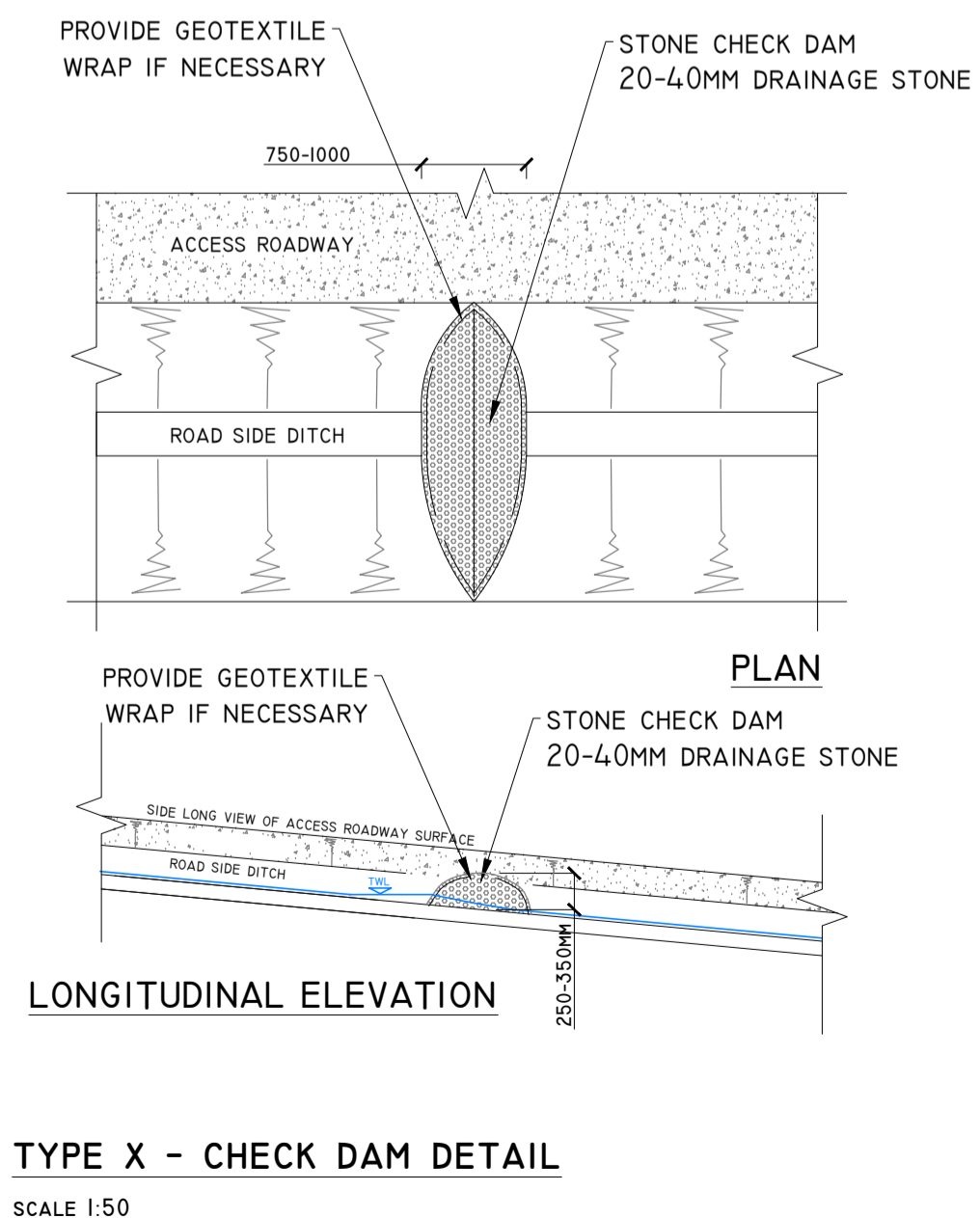
TYPE Y - CHECK DAM DETAIL
SCALE 1:50

DETAIL B

PEAT DITCH SILT TRAP
SCALE 1:25



DETAIL E



TYPE X - CHECK DAM DETAIL
SCALE 1:50

PROJECT DESIGN DRAWING NOTES:

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DRAINAGE DESIGN NOTES:

- ALL DRAINAGE SUBJECT TO MICRO-SITING AND OPTIMISATION ON SITE.
- THE LOCATIONS OF CONSTRUCTION PHASE INTERCEPTOR DRAINS, CHECK DAMS, CULVERTS, SWALES, SETTLEMENT PONDS AND LEVEL SPREADERS ARE SHOWN AS INDICATIVE, AND MAY BE CHANGED TO SUIT THE REQUIREMENTS OF THE LOCAL TOPOGRAPHY.
- SUPERVISING HYDROLOGIST OR ENVIRONMENTAL CLERK OF WORKS (ENVIRONMENTAL SCIENTIST) TO OVERSEE INSTALLATION OF DRAINAGE FEATURES FOLLOWING DETAILED DRAINAGE DESIGN.
- DRAINAGE MEASURES TO BE INSTALLED PRIOR TO, OR AT THE SAME TIME AS THE WORKS ARE INTENDED TO DRAIN.
- DESIGN ELEVATION OF THE WATER SURFACE ALONG THE ROUTE OF THE INTERCEPTOR DRAINS OR SWALES WILL NOT BE LOWER THAN THE DESIGN ELEVATION OF THE WATER SURFACE IN THE OUTLET AT THE LEVEL SPREADER OR SETTLEMENT POND.
- THE SPACING AND FREQUENCY OF THE CHECK DAMS WILL BE DEPENDANT ON THE GRADIENT OF THE INTERCEPTOR DRAIN OR SWALE IN WHICH THEY ARE BEING INSTALLED.
- CHECK DAM DESIGNS TO BE SELECTED BEST TO SUIT PARTICULAR TOPOGRAPHY AND HYDROLOGICAL ENVIRONMENT.
- DOWN GRADIENT SLOPE BELOW LEVEL SPREADER ONTO WHICH THE WATER WILL DISPERSE TO HAVE A GRADE 10%.
- NO DIRECT DISCHARGE OR PUMPING TO WATERCOURSES WILL BE PERMITTED. ALL DISCHARGES FROM LEVEL SPREADERS OR STILLING PONDS TO BE VIA VEGETATED FILTERS. SELECTION OF SUITABLE AREAS TO USE AS VEGETATION FILTERS WILL BE DETERMINED BY THE SIZE OF THE CONTRIBUTING CATCHMENT, SLOPE AND GROUND CONDITIONS.
- NEW TEMPORARY CONSTRUCTION PHASE SETTLEMENT PONDS TO BE SIZED ACCORDING TO THE CATCHMENT AREA THEY WILL BE RECEIVING WATER FROM.
- DIVERSION OF DRAINAGE DITCHES WILL ONLY TAKE PLACE WHEN ALTERNATIVE DRAINAGE DITCH HAS BEEN INSTALLED TO HANDLE THE SAME WATER.
- ALL DRAINAGE SYSTEM FEATURES TO BE SUBJECT OF INSPECTION AND MAINTENANCE PLAN.
- THE LAYOUT SHOWN IS SLIGHTLY OFFSET FOR SCALE PURPOSES, AND ALL DRAINAGE WILL BE INSTALLED AS CLOSE TO ACCESS TRACKS/ROADS AS POSSIBLE.

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

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Client: **BORD NA MONA POWERGEN LTD**

Job: **DERRINLOUGH WIND FARM, CO. OFFALY**

Title: **DRAINAGE DETAILS I**

Figure No: **171221 - 21**

Drawing No: **P1463-0220-A1-171221-21-00A**

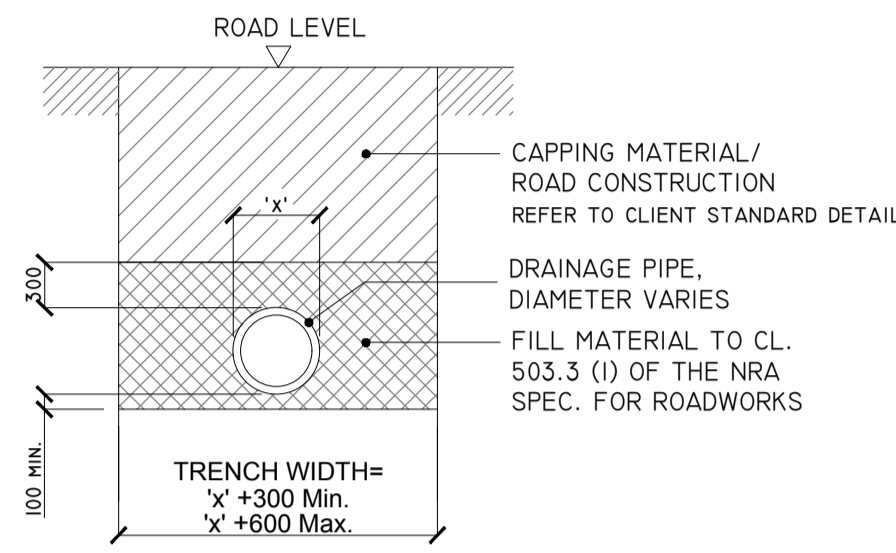
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Scale: **as shown (A1)** Drawn By: **G.D./M.Gill**

Date: **14/02/2020** Checked By: **M.G.**

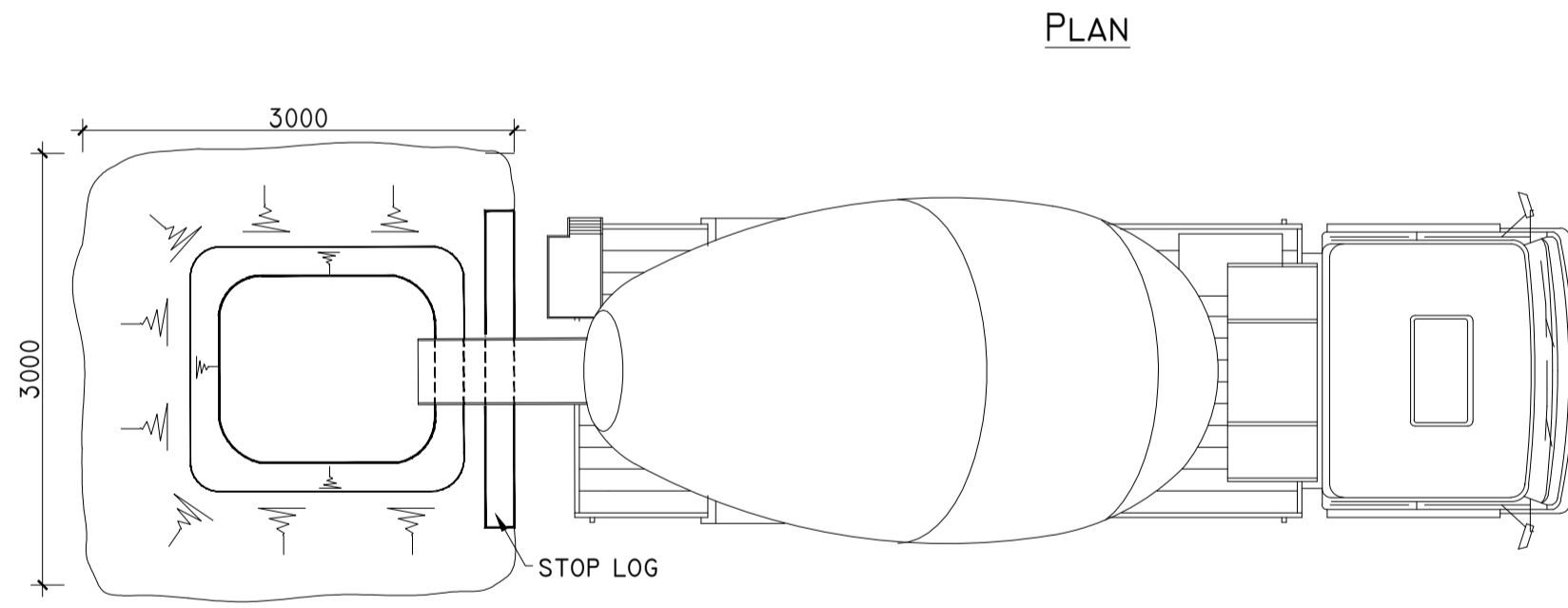
DETAIL F

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

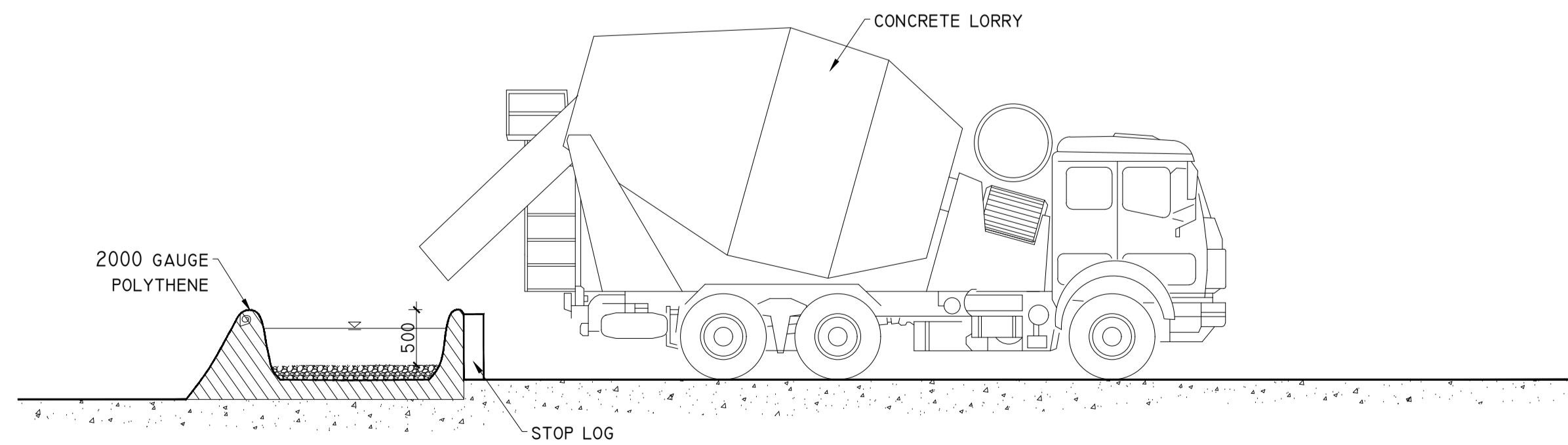


DETAIL I

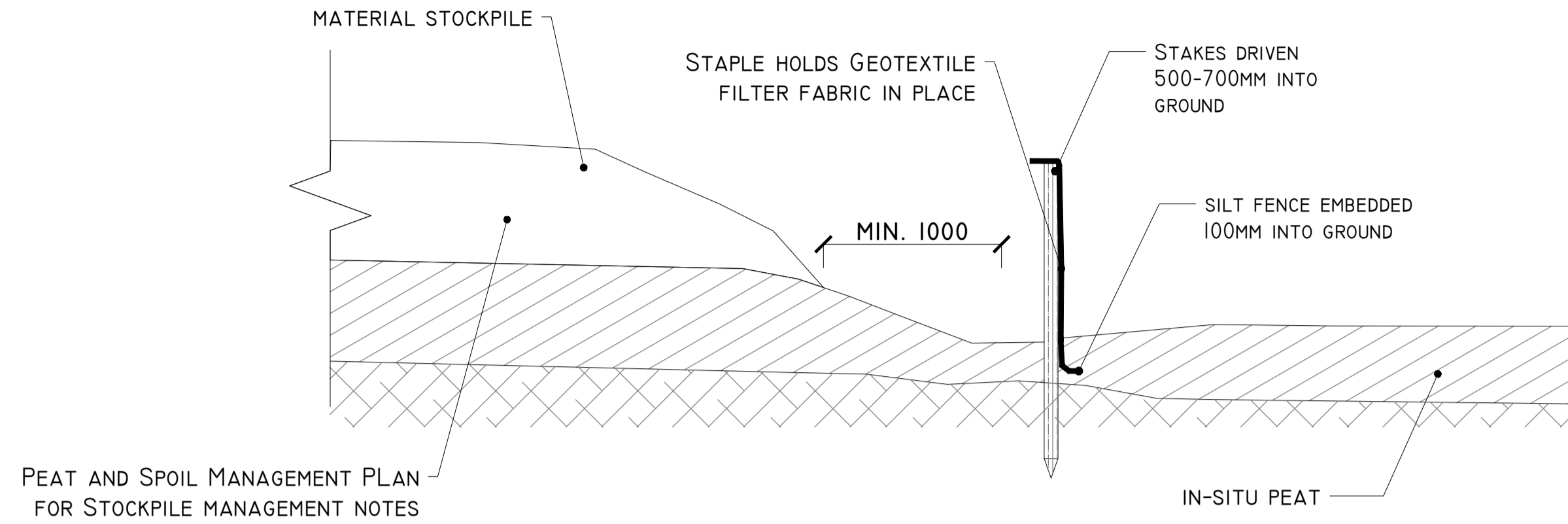
TEMPORARY CONCRETE WASH OUT PIT
SCALE 1:25



ELEVATION



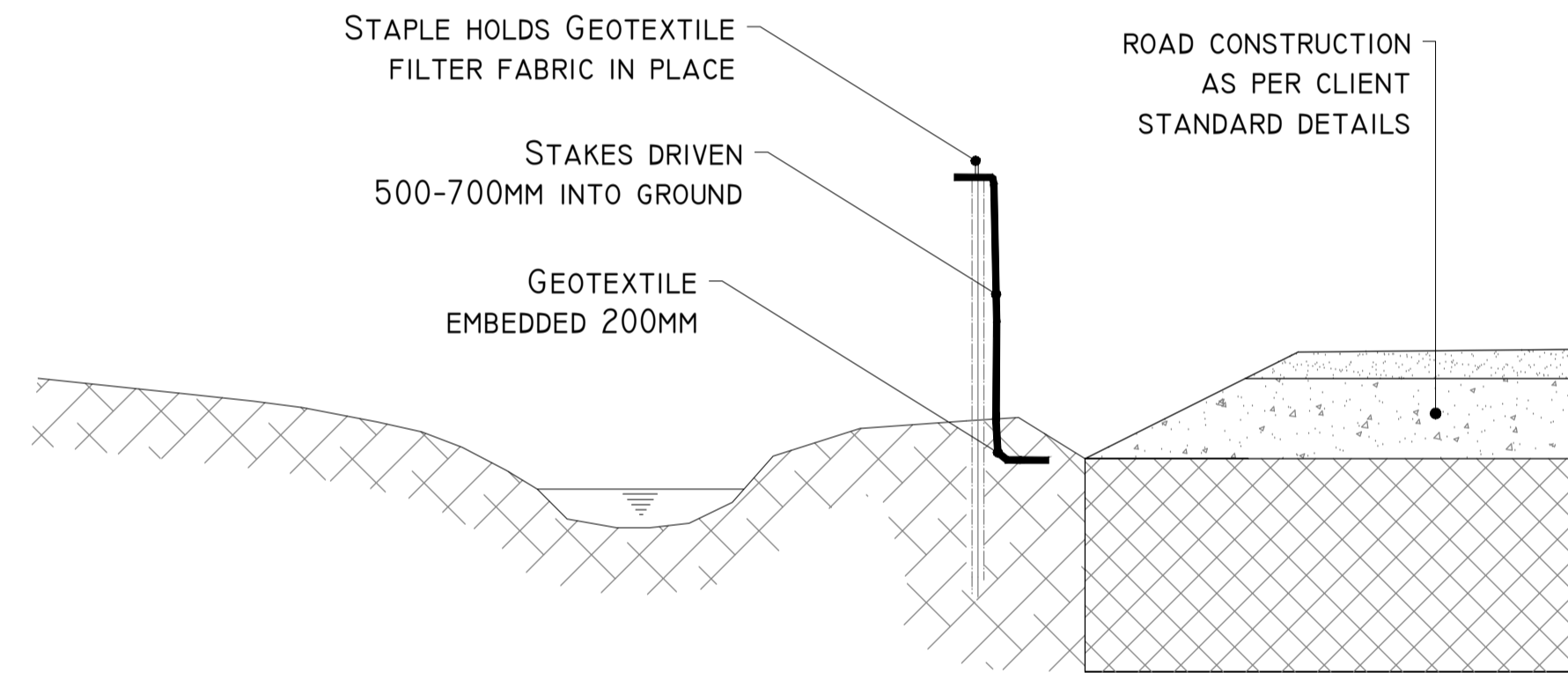
DETAIL G-I



PEAT AND SPOIL MANAGEMENT PLAN
FOR STOCKPILE MANAGEMENT NOTES

SILT FENCE
SCALE 1:25

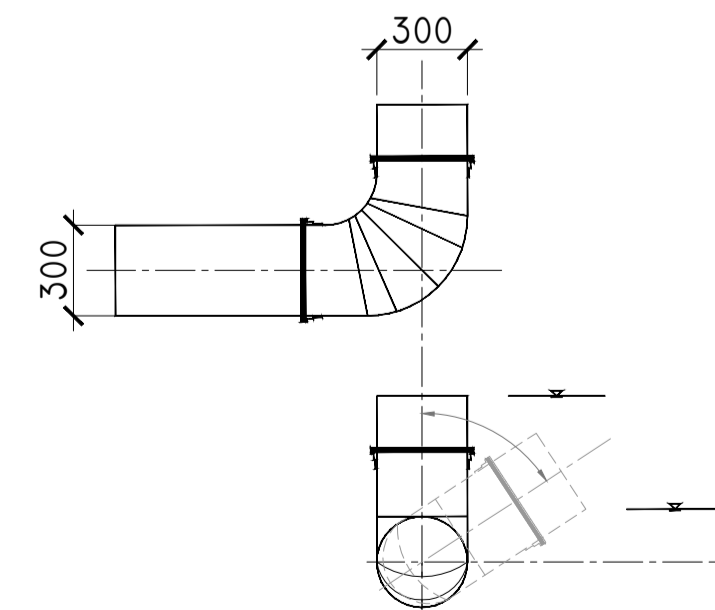
DETAIL G-II



SILT FENCE FOR WATERCOURSE PROTECTION
SCALE 1:25

DETAIL H

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



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1. ALL DRAINAGE SUBJECT TO MICRO-SITING AND OPTIMISATION ON SITE.
2. THE LOCATIONS OF CONSTRUCTION PHASE INTERCEPTOR DRAINS, CHECK DAMS, CULVERTS, SWALES, SETTLEMENT PONDS AND LEVEL SPREADERS ARE SHOWN AS INDICATIVE, AND MAY BE CHANGED TO SUIT THE REQUIREMENTS OF THE LOCAL TOPOGRAPHY.
3. SUPERVISING HYDROLOGIST OR ENVIRONMENTAL CLERK OF WORKS (ENVIRONMENTAL SCIENTIST) TO OVERSEE INSTALLATION OF DRAINAGE FEATURES FOLLOWING DETAILED DRAINAGE DESIGN.
4. DRAINAGE MEASURES TO BE INSTALLED PRIOR TO, OR AT THE SAME TIME AS THE WORKS AREAS THEY ARE INTENDED TO DRAIN.
5. DESIGN ELEVATION OF THE WATER SURFACE ALONG THE ROUTE OF THE INTERCEPTOR DRAINS OR SWALES WILL NOT BE LOWER THAN THE DESIGN ELEVATION OF THE WATER SURFACE IN THE OUTLET AT THE LEVEL SPREADER OR SETTLEMENT POND.
6. THE SPACING AND FREQUENCY OF THE CHECK DAMS WILL BE DEPENDANT ON THE GRADIENT OF THE INTERCEPTOR DRAIN OR SWALE IN WHICH THEY ARE BEING INSTALLED.
7. CHECK DAM DESIGNS TO BE SELECTED BEST TO SUIT PARTICULAR TOPOGRAPHY AND HYDROLOGICAL ENVIRONMENT.
8. DOWN GRADIENT SLOPE BELOW LEVEL SPREADER ONTO WHICH THE WATER WILL DISSIPATE TO HAVE A GRADE 0.5%.
9. NO DIRECT DISCHARGE OR PUMPING TO WATERCOURSES WILL BE PERMITTED. ALL DISCHARGES FROM LEVEL SPREADERS OR STILLING PONDS TO BE VIA VEGETATED FILTERS. SELECTION OR SUITABLE AREAS TO USE AS VEGETATION FILTERS WILL BE DETERMINED BY THE SIZE OF THE CONTRIBUTING CATCHMENT, SLOPE AND GROUND CONDITIONS.
10. NEW TEMPORARY CONSTRUCTION PHASE SETTLEMENT PONDS TO BE SIZED ACCORDING TO THE CATCHMENT AREA THEY WILL BE RECEIVING WATER FROM.
11. DIVERSION OF DRAINAGE DITCHES WILL ONLY TAKE PLACE WHEN ALTERNATIVE DRAINAGE DITCH HAS BEEN INSTALLED TO HANDLE THE SAME WATER.
12. ALL DRAINAGE SYSTEM FEATURES TO BE SUBJECT OF INSPECTION AND MAINTENANCE PLAN.
13. THE LAYOUT SHOWN IS SLIGHTLY OFFSET FOR SCALE PURPOSES, AND ALL DRAINAGE WILL BE INSTALLED AS CLOSE TO ACCESS TRACKS/ROADS AS POSSIBLE.

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

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DRAINAGE DETAILS 2

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