1. Quarry locations are indicative only.
2. Quarry and turbine 10 erosion and sediment control to be integrated.
3. Works are well isolated from stream systems and have a significant grass buffer zone between works area and headwater streams in valley floor.
4. Step topside, where necessary and in locations with independent erosion and sediment control can be established.
5. Where exposed areas are greater than 1900m² then decanting earth bunds will be established.
6. Decanting earth bund may be upgraded to a sediment retention pond if catchment area determines this.
7. Decanting earth bund to capture (through dirty water diversions) quarry, turbine platform and access road.
8. Quarry operation will occur on a quarry platform and discharge via the decanting earth bund. Any topsoil will be on the quarry floor or transferred immediately to end-use location.
9. Turbine platform (and road access) is stabilised as cut occurs illustrated in Sheet 201-1.
10. Stock exclusion to occur during earthworks activity.
11. All principles as per EISP section 5.0 to apply.
12. Detailed design to be established prior to any earthworks occurring.
13. EIRC erosion and sediment control guidelines to apply.
14. Monitoring to occur as per EISP section 11 with an adaptive continuous improvement approach.

NOTES

1. For information purposes only.
2. Boundaries, contours and other base information shown is indicative only and primarily structured by aerial laser survey by Synergy Positioning Systems Ltd in April 2016.
3. Similar data provided in terms of an equal scale or a similar vertical exaggeration.
4. The proposed road alignment, turbine platforms and overall earthworks are based on an indicative road alignment and plan subject to detailed design.
5. Volume estimates based on comparison of existing as is to proposed floor levels.
6. Overall area & volume estimates include 20% contingency for additional earthworks if necessary through detailed design.
7. Existing parcel boundary.
8. Jackson property boundary.
9. Rotokohu farms property boundary.
10. Denize brothers property boundary.
11. Auckland council territorial boundary.
12. Existing major contour.
13. Existing minor contour.
15. Proposed minor contour.
16. EIRC of earthwork.
17. Proposed turbine location.
18. Existing power national grid lines.
19. Proposed road cover line and edge of carriageway.
20. Existing fence.
21. Indicative quarry line.
22. Indicative clearfill site.
23. Existing culvert.
25. Indicative quarry boundary.
NOTES

1. SUBSTATION AND TURBINE 24 BROUGH AND SEDIMENT CONTROL TO BE INTEGRATED
2. SEDIMENT RETENTION POND TO BE ESTABLISHED WITH DRY WATER DIVERSION TAKING FLOWS TO SRP
3. TURBINE IS ALL IN CUT MATERIAL AND WILL BE STABILISED AS CUT PROGRESSES
4. SUBSTATION PLATFORM WILL BE STABILISED ON COMPLETION
5. TOTAL WORKS AREA INCLUDING ACCESS ROAD AND ANCILLARY ACTIVITIES CAN ALL DISCHARGE TO SRP
6. FILL SITE AS SHOWN INDICATIVE ONLY AND WILL BE ESTABLISHED WITH MAXIMUM BATTER SLOPES OF 25 DEGREES TO MINIMISE DROSS AND ALLOW FUTURE STOCK GRAZING
7. STOCK EXCLUSION TO OCCUR DURING EARTHWORKS ACTIVITY
8. ALL PRINCIPLES AS PER ESCP SECTION 5.0 TO APPLY
9. DETAILED SLEEP TO BE ESTABLISHED PRIOR TO ANY EARTHWORKS OCCURRING
10. INDICATIVE LOCATION OF SEDIMENT RETENTION POND

FLOWS TO NORTH AWAY FROM EARTHWORKS

INDICATIVE ONLY. TO BE PROGRESSIVELY STABILIZED

BATTER OF SUBSTATION FALL TO BE VEGETATED

INDICATIVE LOCATION OF SEDIMENT RETENTION POND

FLOWS TO NORTH AWAY FROM EARTHWORKS

LEGEND - SUPPLEMENTARY

- SSF
- FS
- DWD
- <
- DEB
- T
- PROPOSED ROAD 7
- PROPOSED ROAD CENTER LINE AND EDGE OF CARRIAGEWAY
- EXISTING FENCE
- INDICATIVE QUARRY SITE
- INDICATIVE CLEANFILL SITE
- EXISTING CULVERT
- PROPOSED UPGRADED CULVERT
- STREAM (WRC REGIONAL MAP)

LEGEND

EXISTING PARCEL BOUNDARY
- JACKSON PROPERTY BOUNDARY
- ROTOKOHU FARMS PROPERTY BOUNDARY
- DENIZE BROTHERS PROPERTY BOUNDARY
- HDC/MPDC TERRITORIAL BOUNDARY

EXISTING MAJOR CONTOUR
- PROPOSED MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MINOR CONTOUR

EXISTING TRANSPOWER NATIONAL GRID LINES
- PROPOSED ROAD CENTER LINE AND EDGE OF CARRIAGEWAY
- EXISTING FENCE
- INDICATIVE QUARRY LIFE
- INDICATIVE CLEANFILL SITE
- EXISTING CULVERT
- PROPOSED UPGRADED CULVERT
- STREAM (WRC REGIONAL MAP)

- SSF
- FS
- DWD
- <
- DEB
- T

1. FOR INFORMATION PURPOSES ONLY.
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3. COORDINATES SHOWN ARE IN TERMS OF MT EDEN 2000 CIRCUIT AND LEVELS ARE RELATIVE TO THE AUCKLAND 1946 VERTICAL Datum.
4. THE PROPOSED ROAD ALIGNMENT, TURBINE PLATFORMS, AND OVERALL EARTHWORKS ARE BASED ON AN INDICATIVE ROAD ALIGNMENT AND SIMILAR SUBJECT TO DETAILED DESIGN.
5. VOLUME ESTIMATES BASED ON COMPARISON OF EXISTING & PROPOSED SURFACE LEVELS & DO NOT ACCOUNT FOR SUBGRADE CUT, BULKING OR COMPACTION FACTORS.

OVERALL AREA & VOLUME ESTIMATES INCLUDE 20% CONTINGENCY FOR ADDITIONAL EARTHWORKS IF NECESSARY THROUGH DETAILED DESIGN.

KAWAIR WIND FARM
ROTKOHU ROAD, PAEROA

PRELIMINARY CIVIL ENGINEERING DRAWINGS

SCALE AT SHEET

1:1000

1:500

251-3

15.06.18 JT JT

T15022

A RESOURCE CONSENT

Notes:

VENTUS ENERGY (NZ) LTD
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AUCKLAND 0632

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www.tektus.nz

SYNERGY POSITIONING SYSTEMS LTD
3/52 ARRENWAY DRIVE, ALBANY,
AUCKLAND 0632

KAIMAI WIND FARM
ROTOKOHU ROAD, PAEROA

PRELIMINARY CIVIL ENGINEERING DRAWINGS

SCALE AT SHEET

1:500

251-3

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KAIMAI WIND FARM
ROTOKOHU ROAD, PAEROA

PRELIMINARY CIVIL ENGINEERING DRAWINGS

SCALE AT SHEET

1:500

251-3

A RESOURCE CONSENT

Notes:
**NOTES**

1. EROSION AND SEDIMENT CONTROL TO BE INTEGRATED IF PRACTICABLE
2. CLEAR TOPSOIL WHERE NECESSARY AND PLACE IN LOCATIONS WITH "INDEPENDENT" EROSION AND SEDIMENT CONTROL CAN BE ESTABLISHED
3. DECANTING EARTH BUNDS TO BE ESTABLISHED WITH DIRTY WATER DIVERSION TAKING FLOWS TO DEBS
4. ASSEMBLY IS LARGELY IN CUT MATERIAL AND WILL BE STABILISED AS CUT PROGRESSES
5. CLEAN WATER DIVERSION MAY NEED TO BE ESTABLISHED ABOVE THE WORK LOCATION ONCE PROGRESS ON SITE VIBRATION CONTINUES
6. FILL SITE AS SHOWN INDICATIVE ONLY AND WILL BE ESTABLISHED WITH MAXIMUM BATTER SLOPES OF 10 DEGREES TO MINIMISE EROSION AND ALLOW FUTURE STOCK GRAZING
7. STOCK EXCLUSION TO OCCUR DURING EARTHWORKS ACTIVITY
8. ALL PRINCIPLES AS PER ESFC SECTION 5 TO APPLY
9. DETAILED ESFC TO BE ESTABLISHED PRIOR TO ANY EARTHWORKS OCCURRING
10. WRC EROSION AND SEDIMENT CONTROL GUIDELINES TO APPLY
11. MONITORING TO OCCUR AS PER ESFC SECTION 5; WITH AN ADAPTIVE CONTINUOUS IMPROVEMENT APPROACH
12. FOR INFORMATION PURPOSES ONLY.
13. BOUNDARIES, CONTOURS AND OTHER BASE INFORMATION SHOWN IS INDICATIVE ONLY AND PRIMARILY INFORMED BY AERIAL DATA SURVEY BY SYNERGY POSITIONING SYSTEMS LTD IN APRIL 2016.
14. TURBINE 21 EASTING: 484943.93 NORTHING: 736153.72
15. VOLUME ESTIMATES BASED ON COMPARISON OF EXISTING & PROPOSED SURFACE LEVELS & DO NOT ACCOUNT FOR SUBGRADE CUT, BULKING OR COMPACTION FACTORS. OVERALL AREA & VOLUME ESTIMATES INCLUDE 20% CONTINGENCY FOR ADDITIONAL EARTHWORKS IF NECESSARY THROUGH DETAILED DESIGN.
1. All culverts to be installed in dry period. This period should match the culvert construction period.
2. Sandbag or alternative non-erodible barrier to be placed upstream and downstream. Flows to be pumped around works area.
3. Ecological input will be obtained as necessary.
4. Any dirty water pumped from culvert location will be pumped to Turkey Nest which will then flow over grass prior to stream.
5. Provision will be made for rain events and stabilised flow path as necessary.
6. Stock exclusion to occur during streamworks activity.
7. All principles as per ESCP section 5.0 to apply.
8. Detailed design to be established prior to any streamworks occurring.
9. HRC decision and sediment control guidelines to apply.
10. Monitoring to occur as per ESCP section 5.0 with an adaptive continuous improvement approach.

Any pumping of dirty water will be to Turkey Nest and Grass Buffer Zone.
DIVERSION TO BE LINED TO MINIMISE EROSION WHEN ON GRADIENTS GREATER THAN 2% AND/OR WHERE FLOW VELOCITIES EXCEED 1m/sec

DESIGN FLOW DEPTH = 5% AEP STORM

300mm MIN FREEBOARD

ORIGINAL GROUND

EXISTING VEGETATION TO REMAIN UNDISTURBED

DIRTY WATER RUNOFF DIVERSION BUND

CLEAN WATER RUNOFF DIVERSION BUND

COMPACTED EARTH BUND

HYDROSEEDED & MULCHED

MAXIMUM SLOPE 1:2

MAXIMUM SLOPE 1:3

EXISTING PARCEL BOUNDARY

NEW PARCEL BOUNDARY

JACKSON PROPERTY BOUNDARY

ROTOKOHU FARMS PROPERTY BOUNDARY

DENIZE BROTHERS PROPERTY BOUNDARY

HDC/MPDC TERRITORIAL BOUNDARY

EXISTING MAJOR CONTOUR

EXISTING MINOR CONTOUR

PROPOSED MAJOR CONTOUR

PROPOSED MINOR CONTOUR

EXTENT OF EARTHWORK

PROPOSED TURBINE LOCATION

EXISTING TRANSPOWER NATIONAL GRID LINES

PROPOSED ROAD CENTER LINE AND EDGE OF CARRIAGEWAY

EXISTING FENCE

INDICATIVE QUARRY SITE

INDICATIVE CLEANFILL SITE

EXISTING CULVERT

PROPOSED UPGRADED CULVERT

STREAM (WRC REGIONAL MAP)

NOTES:

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3. COORDINATES SHOWN ARE IN TERMS OF INV EDEN 1900 CIRCLE AND LEVELS ARE RELATIVE TO THE AUCKLAND 1946 VERTICAL DATUM.
4. THE PROPOSED ROAD ALIGNMENT, TURBINE PLATFORMS, AND OVERALL EARTHWORKS ARE BASED ON AN INDICATIVE ROAD ALIGNMENT AND REMAIN SUBJECT TO DETAILED DESIGN.
5. FINAL DESIGN OF DETAILS TO BE CONFIRMED IN SITE SPECIFIC EROSION AND SEDIMENT CONTROL PLAN

ESCP STANDARD DETAILS - CLEAN AND DIRTY WATER DIVERSION BUND

NOTE:

FINAL DESIGN TO BE CONFIRMED IN SITE SPECIFIC EROSION AND SEDIMENT CONTROL PLAN

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AUCKLAND 0632

KAIKAII WIND FARM
ROTOKOHU ROAD, PAEROA.

PRELIMINARY CIVIL ENGINEERING DRAWINGS

ESCP STANDARD DETAILS - CLEAN AND DIRTY WATER DIVERSION BUND

NOTE:

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PRELIMINARY CIVIL ENGINEERING DRAWINGS

ESCP STANDARD DETAILS - CLEAN AND DIRTY WATER DIVERSION BUND

LEGEND

EXISTING PARCEL BOUNDARY

NEW PARCEL BOUNDARY

JACKSON PROPERTY BOUNDARY

ROTOKOHU FARMS PROPERTY BOUNDARY

DENIZE BROTHERS PROPERTY BOUNDARY

HDC/MPDC TERRITORIAL BOUNDARY

EXISTING MAJOR CONTOUR

EXISTING MINOR CONTOUR

PROPOSED MAJOR CONTOUR

PROPOSED MINOR CONTOUR

EXTENT OF EARTHWORK

PROPOSED TURBINE LOCATION

EXISTING TRANSPOWER NATIONAL GRID LINES

PROPOSED ROAD CENTER LINE AND EDGE OF CARRIAGEWAY

EXISTING FENCE

INDICATIVE QUARRY SITE

INDICATIVE CLEANFILL SITE

EXISTING CULVERT

PROPOSED UPGRADED CULVERT

STREAM (WRC REGIONAL MAP)
SEDIMENT PITS STANDARD DETAILS

- Sediment pit cut into level in situ soil, min. 1m deep.
- Road/track cut and cover methodology.
- Overflow flow direction.
- Vegetated level lip to spread overflows evenly.
- Topsoil bunds (grassed) to ensure all flows exit over level lip.
- Even slope into sediment pit to avoid erosion (1:5 grade).

NOTE: Final design to be confirmed in site specific erosion and sediment control plan.

All sediment pits to discharge over grass.
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5. FINAL DESIGN OF DETAILS TO BE CONFIRMED IN SITE SPECIFIC EROSION AND SEDIMENT CONTROL PLAN.

**ELEVATION**

**CROSS SECTION**

**STANDARD ROCK CHECK DAM**

<table>
<thead>
<tr>
<th>SLOPE</th>
<th>SPACING (m) BETWEEN DAMS [450mm CENTRE HEIGHT]</th>
<th>SPACING (m) BETWEEN DAMS [600mm CENTRE HEIGHT]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2% OR LESS</td>
<td>24</td>
<td>30</td>
</tr>
<tr>
<td>2% - 4%</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>4% - 7%</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>7% - 10%</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>OVER 10%</td>
<td>USE STABILISED CHANNEL</td>
<td>USE STABILISED CHANNEL</td>
</tr>
</tbody>
</table>

NOTE: FINAL DESIGN TO BE CONFIRMED IN SITE SPECIFIC EROSION AND SEDIMENT CONTROL PLAN.
MINIMUM CONCRETE HAUNCHING 1m DEEP

CONCRETE RISER MAY REQUIRE 12.10.18

LT

GEOTEXTILE SECURED FIRMLY TO THE
BARE AREAS TO BE STABILISED WITH
RETAINING THE EXISTING GRASS COVER.
EXISTING GROUND WHERE POSSIBLE,
CONCRETE, GEOTEXTILE OR OTHER
ARMOURING UNDERNEATH

RIP RAP PLACED AT POND OUTLET
WITH GEOTEXTILE PLACED ENOUGH TO ENSURE MACHINERY ACCESS FOR
OTHER ACCESS POINTS AVAILABLE

WIDTH OF TOP EMBANKMENT SHOULD BE WIDE
EMBANKMENT FACE POURED CONCRETE
ANTI-SEEP COLLAR

TYPICAL POND ISOMETRIC PLAN VIEWS

BELOW THE SPILLWAY INVERT
POND TO A DEPTH OF AT LEAST 500mm
GEOTEXTILE SHOULD BE LAID INTO THE
LARGE ROCK TO BREAK UP FLOW
FREEBOARD 300mm
1% OR 2% GRADE
DISCHARGE PIPE LAID AT 300mm DIAMETER

EMERGENCY SPILLWAY TO BE
AEP EVENT WITHOUT ERODING
SIZED TO ACCOMMODATE THE 1%

CONCRETE
AND PINNING APPROPRIATE GEOTEXTILE /
TO ELIMINATE ALL VOIDS PRIOR TO LAYING
SPILLWAY COMPACTED AND SMOOTHED
AND FREE OF VOIDS

LOWEST INLET PIPE TO RISER IS
TENSION ON FLEXIBLE JOINT
ANGLED UPWARD AT 15° TO EASE
PREVENT FLOATING
WEIGHING OR ANCHORING TO

BATTER NEEDS TO STABALISED
OTHERWISE JUST THE OUTER
THROUGH A WINTER PERIOD,
THE POND IS TO REMAIN
STABILISED WITH VEGETATION IF
ENTERS AT THE INLET END
RUNOFF DIVERSION CHANNEL / BASED ON PREVIOUS STUDY TO SUMMARISE
AND CONTROL LEVEL OF DECANT
FOR ALL DECANTS
WARATAH STAKES REQUIRED
VARATAHS PLACED EITHER SIDE OF
THE DECANT PIPE

DECANT - 6 EQUALLY SPACED
ALONG THE FULL LENGTH OF
THE DECANT PIPE
DECANT ARM AS ALTERNATIVE
MEANS OF SECURING DECANT
WARATAHS

WIRE OR STEEL STRAPS TO
JOIN DECANT AND FLOAT
STANDARD END CAPS
SINGLE WARATAH FIXED FIRMLY
BEHIND CABLE TIES / STRAPS
REQUIRED TO WEIGHT DECANT
BEHIND WARATAH
WORKSHOPS TO HEAVY EQUIPMENT ON EMBANKMENT FACE
RAPID HUNTING WINDOW TO EMBANKMENT FACE

LOW SHALLOW LEVEL SPILLWAY OVER
SLEEPING GROUND WITHIN ALLUVIAL
DEPOSITS TO ENSURE GRAVE COVER,
SAME AREA TO BE STABILIZED WITH
CONCRETE, GEOTEXTILE OR OTHER
ARMOURING

LEVEL SPREADER FULL WIDTH OF INLET END, STABILIZED FROM THE BEGINNING OF THE INLET TO THE POND INVERT WITH 2 LAYER OF GEOTEXTILE

LEVEL SPREADER 1500mm x 250mm
THICKNESS

LEVEL SPREADER 1500mm x 100mm
THICKNESS

DECANT ARM AS ALTERNATIVE
MEANS OF DECANTING
GEOTEXTILE WRAPPED AROUND LEVEL SPREADER FULL WIDTH OF INLET END, STABILIZED FROM THE BEGINNING OF THE INLET TO THE POND INVERT WITH 2 LAYER OF GEOTEXTILE

5. FINAL DESIGN OF DETAILS TO BE CONFIRMED IN SITE SPECIFIC EROSION AND SEDIMENT CONTROL PLAN

4. THE PROPOSED ROAD ALIGNMENT, TURBINE PLATFORMS, AND OVERALL EARTHWORKS ARE BASED ON AN INDICATIVE ROAD ALIGNMENT AND REMAIN SUBJECT TO DETAILED DESIGN.

3. COORDINATES SHOWN ARE IN TERMS OF MT EDEN 2000
VERTICAL DATUM.

2. BOUNDARIES, CONTOURS AND OTHER BASE INFORMATION SHOWN IS INDICATIVE ONLY AND PRIMARILY INFORMED BY AERIAL LIDAR SURVEY BY SYNERGY POSITIONING SYSTEMS LTD IN APRIL 2014
NON-BOUNDARY DATA IS RELATIVE TO THE AUCKLAND 1946
VERTICAL DATUM.

1. FOR INFORMATION PURPOSES ONLY.
ROAD ALIGNMENT AND REMAIN SUBJECT TO DETAILED DESIGN.
SUPER SILT FENCE STANDARD DETAIL

UPPER TENSIONED GALVANISED WIRE

LOWER TENSIONED GALVANISED WIRE

GROUND LEVEL

WARRATAH OR STANDARD WOODEN FENCEPOSTS

CHAIN LINK FENCING BETWEEN POSTS AND GEOTEXTILE

GEOTEXTILE - 2nd LAYER

GEOTEXTILE - 1st LAYER

FLOW

FLOW

ELEVATION

200mm MIN

400mm MIN

800mm MIN

1m MIN

3m MAX

WARRATAH BACK STAYS
INSTALL AS EXTRA SUPPORT WHERE REQUIRED

EMBED GEOTEXTILE AND NETTING SUPPORT 200mm MIN. INTO GROUND (COVER WITH SUITABLE BACKFILL AND COMPACT)

CROSS SECTION

NOTE:
FINAL DESIGN TO BE CONFIRMED IN SITE SPECIFIC EROSION AND SEDIMENT CONTROL PLAN
T-BAR DECANT FIXED TO WARRATAH STAKES WITH NYLON CORD

SPILLWAY STABILISED WITH TWO LAYERS OF GEOTEXTILE (MIN. WIDTH = 2m)

STABILISED SPILLWAY

ENGINEERED FILL ON COMPACTED GROUND

250mm FREEBOARD

EMERGENCY SPILLWAY

CROSS SECTION

100mm PVC PIPE THROUGH BUND

NYLON CORD TIES TO SUSPEND DECANT FROM WARRATAHS AT CORRECT HEIGHT

DECANT DETAIL

500mm LONG 100mm DIAMETER PVC PIPE FLOAT WITH STANDARD 100mm END CAPS. FLOAT STRAPPED TO 40mm DIAMETER PVC DECANT PIPE WITH STAINLESS STEEL STRAPS OR ZIP TIES.

500mm

1200mm

STANDARD 40mm TEE JOINT (GLUED)

100mm DIAMETER PVC PIPE UPSTAND WITH TOP POSITIONED 100mm BELOW THE LEVEL OF EMERGENCY SPILLWAY. THE TREATMENT VOLUME IS TO BE MEASURED TO THE TOP OF THE UPSTAND

100mm TO 40mm REDUCER FITTING TO BE GLUED

FLEXIBLE RUBBER/NEOPRENE JOINT (SUCH AS PLUMBQWIK) HOSE CLAMPED

JOIN TO BE MADE USING PK SCREWS AND CONSTRUCTION TAPE

STANDARD 100mm TEE JOINT (GLUED)

STANDARD END CAPS

WIRE OR STEEL STRAPS TO JOIN DECANT AND FLOAT

DECANT DETAIL

NOTE:

FINAL DESIGN TO BE CONFIRMED IN SITE SPECIFIC EROSION AND SEDIMENT CONTROL PLAN