PROPOSED INYANDA ROODEPLAAT 140 MW WIND FARM DEVELOPMENT

STORMWATER MANAGEMENT AND EROSION CONTROL REPORT

PROJECT NO.: R1011-SW & EC/01

MARCH 2016

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Inyanda Energy Projects (Pty) Ltd

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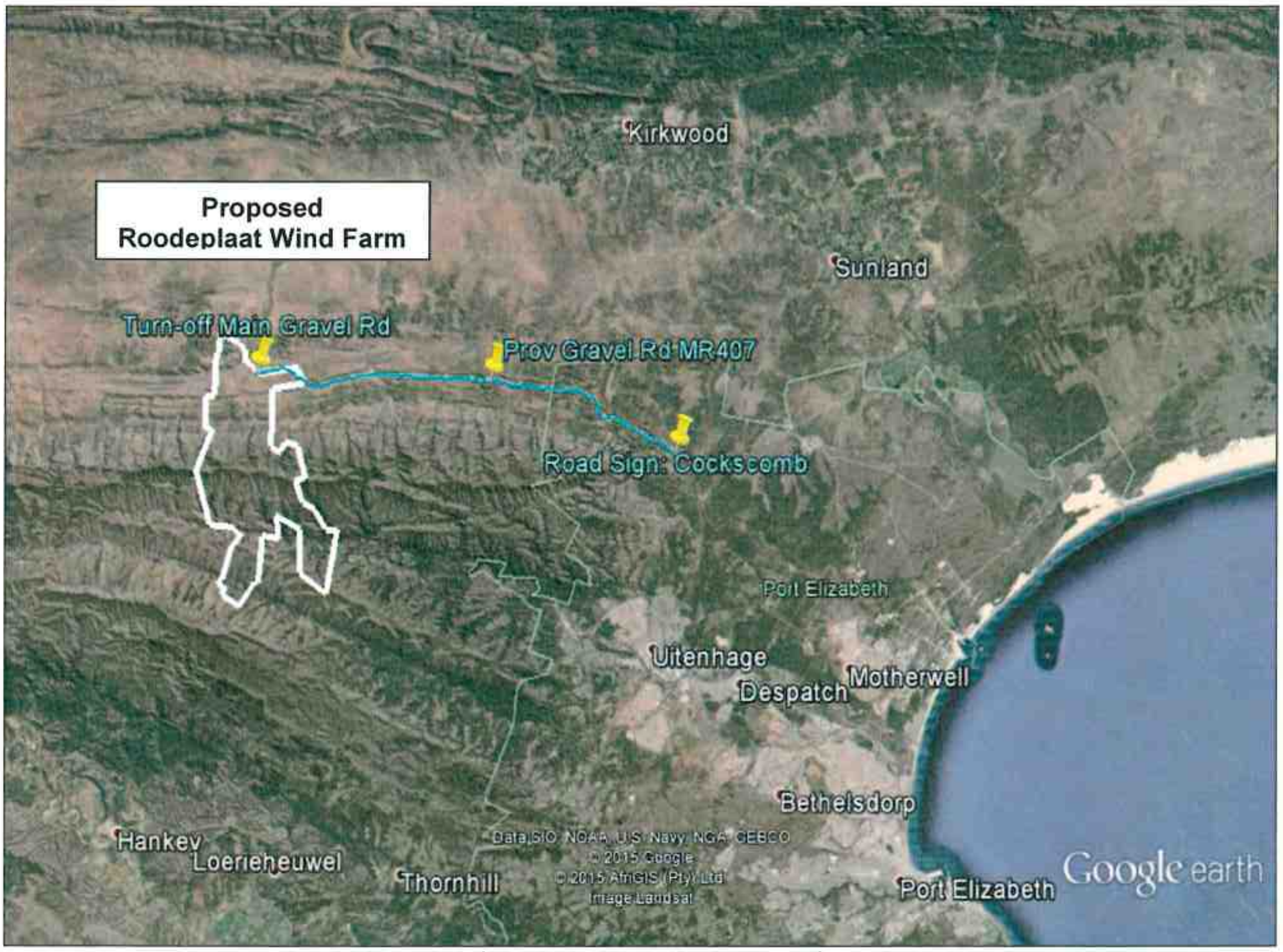
1 INTRODUCTION

1.1 Background Information

Inyanda Energy Projects (Pty) Ltd intends to develop a 140MW wind energy project, located within the Sundays River Valley Local Municipality, approximately 40km north west of Uitenhage, Eastern Cape (refer to **Map 1** below). The proposed Inyanda Roodeplaat Wind Farm will consist of a maximum of 55 turbines, depending on the selected turbine model and size of the turbines.



Map 1: *Locality map of the proposed 140MW wind farm development.*

1.2 Terms of Reference

Inyanda Energy Projects (Pty) Ltd appointed Afri Coast Consulting Engineers (Pty) Ltd to carry out several professional engineering services related to the development of the proposed wind farm. This Storm Water Management and Erosion Control Report forms an integral part of the supportive documentation required for the Environmental Impact Assessments (EIA) and application to DEDEAT.

1.3 Purpose of the Report

The purpose of this report is to investigate and to comment on the current site conditions and expected impacts or changes, due to storm water run-off characteristics. The wind farm development, especially the internal access roads and proposed turbine footprints areas, will drastically change the topography and natural storm water run-off characteristics of the mountainous landscape.

Steep gradients are a concern when managing storm water run-off, and ensuring sufficient erosion protection at exposed slopes. Hence, recommendations are needed to guide the detail design stage, ensuring that the landscape, vegetation and water courses are protected against excessive storm water run-off, and that good Stormwater Management principles will be set in place during the construction stage, for both permanent and temporary construction areas.

1.4 Limitations of the Report

No detail designs have been done yet. This report therefore does not present or discuss any designed infrastructure, but is limited to highlight concepts related to storm water management and erosion control, which need to be addressed during the Detail Design Stage. Road gradients (longitudinal and cross-fall), as well as Storm Water channels and related storm water run-off velocities, have thus not yet been calculated.

Information on the soil and sub-strata conditions of the development are based on visual inspections made during the geo-technical trail test pit excavations. Most soil conditions as inspected, were relative consistent, but more site excavations, may expose different soil conditions which may be more prone to erosion and wash-aways of fine materials (sand and silt).

1.5 Site Locality and Topography

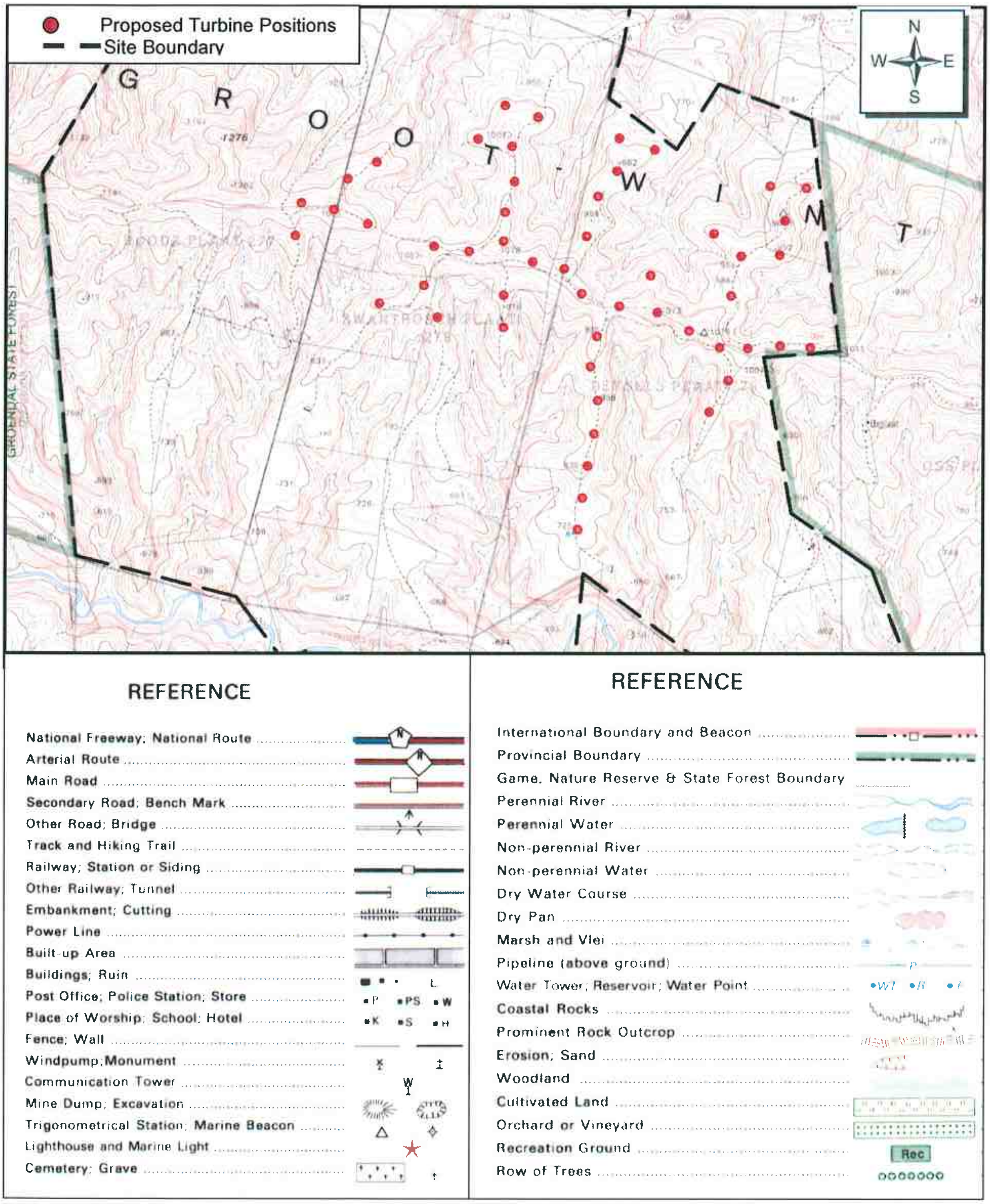
The Wind Farm development is approximately 12,235 ha in size. Access to the site is gained from the provincial gravel road (MR407), approximately 40km west of the R75 Cockscomb turn-off. The site boundary is positioned between coordinates:

- *Latitude:* 33°41'20.24"S and 33°29'42.24"S and
- *Longitude:* 25°00'19.01."E and 25°07'29.05"E.

The wind farm site is situated in the Fish to Tsitsikamma Catchment Area (DWA Region 15), in the Quaternary Sub-Catchment Area : Sundays River N40B. The average rainfall (measured MAP) of the region ranged from 221 to 258 mm / annum, which is very low. Thundershower event are rear and drizzle showers, measuring only a few mm of precipitation per event, occurs more frequently.

The landscape is mountainous with rolling hills, covered with thicken grass land and fynbos. Primary ridges following an east-west direction with valleys running northwards and southwards from the main ridges, forming several finger-like secondary rolling hills in between The elevation of the site is approximately 1200m MSL (mean sea level) on the peaks sloping down to 420m MSL to the north and 400m MSL to the south. The turbines are located predominantly on the ridge of the mountains.

The portion of the Topographical Map indicating the turbine positions were extracted and shown below as **Map 1**. (See **Annexure A,** for full Topographical Map 3325 CA).



Map 1: Extracted Topographical Map *(Refer to Topographical Map 3325CA)*

1.6 Ground Water

No groundwater seepage was detected at any of the geo-technical trail test pits excavated. Generally dry conditions prevail with slightly moist conditions evident in a few test pits.

1.7 Site Stability

No signs of ground instability or flood damage, such as slip scars, landslides, major erosion ditches, rockfalls and small collapses were noticed on the steep mountainous slopes. This indicates that the current natural topography, with its steep gradients and good vegetated land cover, prevents the normal over-land storm water run-off velocities to increase too high causing natural flood damage.

The side slopes to the excavations of the existing roads are close to vertical with no signs of instability. It was evident from all site test pit excavations that the vertical side-slopes up to 3m depths, are very stable, consisting of fractured layered hardrock. It is therefore foreseen that embankment slopes on cut-faces, during the construction excavations, can safely be designed close to vertical (typically 5:1), without risk of collapsing.

2 STORMWATER MANAGEMENT

Stormwater planning is essential to prevent erosion of natural and agricultural land and flooding of disturbed areas and new infrastructure. New developments and impacted footprints shall be designed, constructed and maintained using best Storm Water Management practices to prevent flooding, protect natural water quality, reduce soil erosion, maintain and improve natural wildlife habitat and contribute to the aesthetic values of the development.

The concept and principles to protect any identified sensitive hydrological features should be contained the Environmental Management Plan (EMP) and an Environmental Method Statement (EMS), which should both form part of the conditions of the Environmental Approval. This should be made available to the Contractor a tender stage as compulsory requirements, in order to already incorporate in their planning and costing exercises, prior to commencement of construction.

The primary design criteria to design hard surface infrastructure for the Wind Farm Development (access roads and turbine crane platforms etc.) will be to minimise unnecessary disturbance during excavation and to control the storm water run-off velocities.

Measures recommended to mitigate storm water erosion and flooding should be incorporated in the final detail designs, and may include some or all of the following :

a) limitation of land disturbance (minimise clearing and grubbing of native vegetated areas, as well as topsoil removal) to suit the requirements of the Development and potential fire breaks;

b) all vegetation clearing should occur in in a phased manner in accordance with the construction programme to minimise large bare open areas for long periods, before construction activities will commence, to minimise the possibility of soil erosion. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation wash aways into the lower portions of the catchment;

c) minimization of impervious surfaces – eg. avoid excessive open areas for road turning radii or service roads along the overhead cables, which could be left undisturbed natural vegetation, with possible only trimming trees and bushes;

d) maintenance of vegetated buffers and natural vegetation strips;

e) the use of terraces, berms and / or contoured landscapes;

f) the use of cut-off drains or berms at the top of cut embankments above roads and platforms;

g) limit the length of road side drains and discharge storm water run-off as quickly as possible via mitre drains to natural water courses or valleys;

h) the use of vegetated open channels next to roads to convey and treat storm water runoff (acting as a bio-filter : allow suspended sediment particles to settle, and to remove pollutants) and resulting in slower discharged velocities;

i) introduce storm water runoff energy breakers in road side drains, eg. grass or rock-lined swales;

j) the use of infiltration systems, eg. cut-off sub-soil drains to minimise the impact of sub-surface ground water, especially at the foot of high cut embankment next to the road;

k) washing and cleaning of equipment should also be done at dedicated demarcated areas at the plant storage area. Berms or lined ponds should be constructed, in order to trap any cement, oils and fuel spillages and to prevent excessive soil erosion at the washing areas.

l) where steep areas exist, especially fill embankments, suitable storm water management features and vegetation rehabilitation must be exercised, to prevent soil erosion and completely prevent any sediment from entering the downstream water courses;

m) Erosion and sedimentation into water courses must be minimised through the effective stabilisation (eg. using Gabions and/or Reno mattresses) and the re-vegetation of any disturbed riverbanks, especially at fresh embankment cuts near the stream crossings;

The Developer will be required to provide sufficient and suitable on-site storm water management features as proposed above, and will also be responsible to maintain the storm water and open hard surface infrastructure during the entire operation period of the Wind Farm facility.

3 EROSION CONTROL

The lack of storm water planning during Detail Design stage will lead excessive erosion over time. The lack off effective erosion control will result in the wash-away of fine material like sand and silt. This will create un-natural storm water run-off paths, which will developed into erosion channels and later-on may develop into land slip scars.

If erosion occurs on gravel road surfaces, due to excessive storm water run-off with too high velocities, regular grading maintenance will be required to solve minor surface erosion problems. If regular maintenance is neglected, road surface erosion will developed in cross-cut channels which may negatively impact on the accessibility of transport roads.

If erosion occurs on gravel fill embankments, which are generally 'softer' than the expected rock face cut slopes, erosion channels may very soon developed. Storm water will opt to flow down the path of least resistance, hence it will discharge via erosion channels, at higher velocities and causing more severe wash-aways. This snow-ball effect may soon lead to major road slippages, which may have major cost implications should some roads become inaccessible during the construction or turbine transportation stages.

It is therefore recommended that fill slopes be covered with topsoil and grass as minimum protection to minimise the development of erosion. Geo-synthetic material such as Kaytech's Soil Saver or similar and Bidim membranes may be used to protect and stabilize fill embankments.

Photo 6 : View of existing gravel road (Provincial Minor Road MN 50475) providing access to the wind farm.

Note the stable excavated rock face (Cut Slope) on right hand side (RHS) of the road, showing minimal exposure / risk for erosion damage.

Photo 7 : View of existing gravel road (Provincial Minor Road MN 50475) providing access to the wind farm. Note the fill embankment on lower side of road profile, showing high exposure / risk for erosion damage.

Based on site investigation observed, it is not foreseen that rock faced cut embankments would need protection against scouring or erosion, except the proposed cut–off top berm. However, at localised sections along the gravel roads, it may be necessary to protect the toe of cut embankments from local slip, by anchoring rock-filled gabion cages on road level.

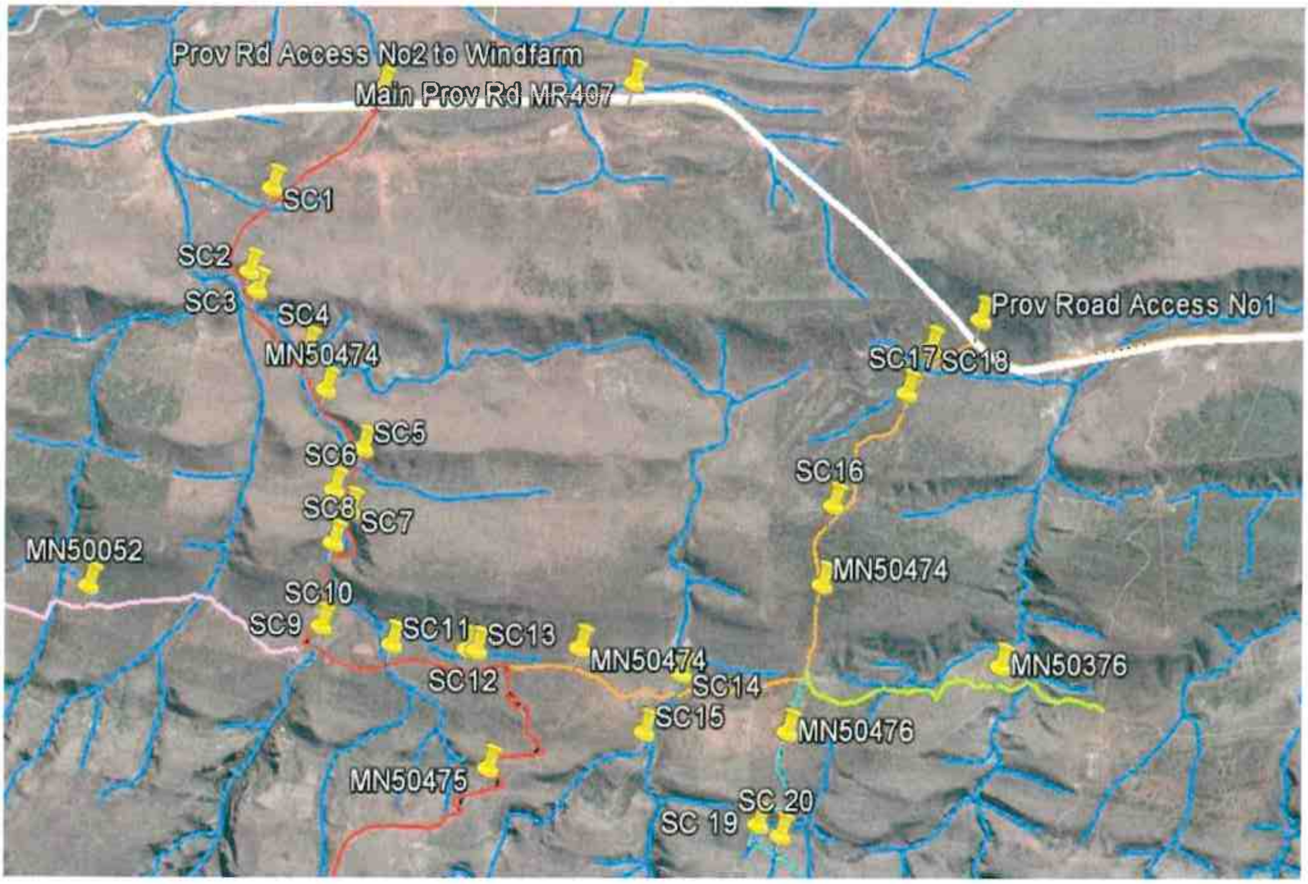
4 STREAM CROSSINGS

4.1 Locations of Existing Stream Crossings

Road access to the Wind Farm Development will be via an existing Provincial Minor Road (MN50474), intersecting at two places with the Provincial Main Road MR407, making a loop through the lower lying areas of the Wind Farm Development area. Two other Provincial Minor Roads (MN50475 and MN50476) will provide an eastern and a western access to the Wind Farm Development, from the loop access road.

These three minor access roads are all narrow gravel roads with several sharp horizontal curves and steep vertical gradients. These three roads are crossing twenty (20) minor non-perennial water courses via existing low level concrete drifts or small storm water culvert structures. These water course crossings are marked as stream crossing “SC 1” to “SC 20” on Map2 below.

Refer to the table "***Preliminary Designs (Storm Water Run-off Calculations)***", Annexure B, for the co-ordinate list of the exact positions of these 20 stream crossings, which are also captured in the Google file : "***Roodeplaat - Stream Crossings.kml***".



Map 2 : Showing all the existing Stream Crossings on the Minor Provincial Roads

4.2 Condition of Existing Stream Crossings

Typical existing stream crossings at the identified water courses are shown below on photos 1 to 3. The water courses are all non-perennial with no or very low water flows observed. These stream crossings exist on the lower lying flatter areas of the development site, along the access routes towards the proposed wind turbines. No water course crossings exist near or on the access roads linking the various turbine sites.

Low level concrete drifts exist at most of the stream crossings, with only a few stream crossings where storm water pipe infrastructure currently exists. Low run-off storm water volumes generally seepages underground through the fractured rock or pebble bed under the concrete drifts. Higher floods with over top the concrete drifts for a few hours until the run-off peak has passed.

No signs of major flooding or erosion damage has been observed at the existing stream crossings. However, the condition of the concrete drifts are relative poor and provide no protection against flood peak events.

It can not be tolerated to allow that road access be cut-off during the wind farm construction and transportation period.

Photo 1 : Typical View of Stream Crossing (non-perennial / dry water course) on the Provincial Minor Road MN 50474. Note sandy river bed and concrete drift in front.

Photo 2 : Typical View of Stream Crossing (non-perennial / dry water course) on the Provincial Minor Road MN 50474. Note pebble river bed and concrete drift in front.

Photo 3 : Typical View of Stream Crossing (non-perennial / dry water course) on the Provincial Minor Road MN 50474. Note sandy river bed with large boulders and concrete drift in front.

4.3 Proposed Upgrading Work at Stream Crossings

The road widths, the longitudinal gradients of the road as well as the current condition of these stream crossings are insufficient to accommodate the construction and abnormal turbine delivery transport vehicles. These stream crossings will have to be upgraded or re-constructed to suit the wider roads and flatter gradients. **It is recommended that the flow capacity of each of the stream crossing be upgraded to accommodate a 1:10 year recurrence flood peak**

This will impact on the existing storm water infrastructure, which is currently insufficient and will also have to be upgraded. Upgrading work at the existing storm water infrastructure will have to comply with :

- the new 6m wide road widths;
- the flattened vertical gradients, hence the road fill on top of the structures will have to be raised;
- the structures' capacity (openings) will have to be upgraded to accommodate a 1:10 year flood.

The existing storm water structures (at all 20 water course crossings) will therefore have to be upgraded. Upgrading work will take place within 32m of a water course (*GNR 544, Activities 11, 18 and 39* - will be triggered in this instance) and it is expected that in all 20 instances, excavations (moving material into or remove material from a water course – *GNR 544, Activity 18*) will exceed the minimum volume of 5m³.

Storm water run-off calculation have been made based on the Rational Method and the understanding of the site characteristics, to calculate the expected 1:10 year flood at each of these stream crossings. The ***Stream Crossings Summary Table in Annexure B*** lists all stream crossings, with proposed sizes of new box culvert structures to be installed.

The ***preliminary drawing (R1011-D01) bound in Annexure C***, showing a typical cross-section of a stream crossing upgrade. The bedrock material of the stream crossing will be disturbed to allow for a stable and level foundation and good sub-surface drainage below the structure. Imported side fill material will be required to smooth out steep gradients. Concrete or stone-filled gabion cages will be constructed as new head walls and wing walls to protect the new storm water box culvert structures from under scouring, erosion on the fill slopes and potential flood damage.

The gravel road surfaces along the steep downhill and uphill gradients near the stream crossings, will be exposed to higher wheel friction due to breaking and pulling actions, while transporting heavy loads. It is therefore recommended that the road surface of the access roads, where it they crossing these stream crossings (water courses), should be concrete lined to prevent rutting, pothole formation and surface erosion. This will limit future maintenance and negate flood damage on critical areas along the transport routes.

All electrical cables on-site, running from the various turbine positions to the new on-site Electrical Sub-Station position, will be installed underground in the fill embankments of the new internal road profile. High-voltage overhead cables will span from the Electrical Sub-Station area, across the valleys to the Provincial Main Road. Hence, there will be no need to install any electrical cables along the access roads, which will have to cross any of the water courses.

5 ROAD AND PLATFORM CONSTRUCTIONS

5.1 Existing Roads to the Wind Farm

Map 2 above and the Site Development Plan (R1011-GA-SDP-rev6) bound in Annexure D show the location of all existing roads. The existing access roads and especially all farm roads, linking the proposed various turbine position, are narrow, very steep and have sharp horizontal curves. These roads are currently all gravel roads or two-track farm roads, insufficient for the transport of the large wind turbine components with their extreme dimensions.

The topography and soil formation form existing road surfaces and cut embankments observed, consists of fractured layered rock formations, which appeared to be fairly stable.

No Stormwater side channels or any storm water infrastructure (expect the stream crossings as discussed above), exist along any of the existing internal gravel roads. Storm water runs overland from higher laying areas to the existing roads and down the valleys, following natural flow patterns. No natural drainage paths were disturbed or new drainage paths were created due to the existing road infrastructure. Several localized areas were observed where storm water management is required. The construction of storm water infrastructure like pipe conduits, side drains and mitre drains are lacking, which will assist with the control of natural over-land storm water run-off and it will protect the road pavement layerworks form scouring and erosion.

Sections of the gravel surfaces of the existing roads are were rough / rocky, where fines were driven away and washed out. This is primarily due to the lack of a quality well-compacted base layer with a suitable PI (plasticity) content, to bind the pavement material. Suitable well graded material is required to re-gravel the surfaces of the existing roads, to prevent scouring of fines, especially along steep longitudinal gradients.

5.2 New Road Constructions on the Wind Farm

All access roads (Provincial Minor Roads) as well as all internal roads will have to be upgraded to suitable 6m wide roads, together with considerable horizontal and vertical re-alignments, to suit the minimum turbine transportation requirements. Several new roads will also have to be constructed on greenfields areas to link turbine platforms.

Steep natural cross fall gradients exist, which will results in deep cuts and fill side embankments of the new road infrastructure. The road alignments will therefore have to be carefully planned and designed to suit the "rolling hills" topography of the area. Detail designs need to be carefully executed to limit the extent of the environmental impacts and final footprint width of the new road profiles, which may be much more that the road width considering the embankment slopes. Road designs must further be optimised to balance the depths of cuts and fills of road volumes. This will limit the exposed faces of slopes. All exposed slopes are prone to erosion and flooding, which may cause severe damage to road infrastructure and wash-aways of material.

Drawing R1011-D02, bound in Annexure C shows a typical cross section profile of the new road infrastructure planned. It is recommended to construct storm water side drains along road sections in fill, with a possible cut-off berm on top of the cut slope, depending of the cut height and upper catchment area. Road fill embankments will as far as possible be used to install the electrical cables, to prevent additional excavation in natural material.

It is recommended that all initial grass and topsoil removals, should be stockpiled on or near the road construction site, at dedicated areas in heaps not exceeding 2,5m. The same natural top-soil and grass material must be used to cover all gravel exposed slopes, especially fill slopes which will be more prone to scouring and erosion, due to higher storm water run-off velocities generated along the hard road surfaces.

5.3 Foundation Turbine Platforms

Large open levelled hard surfaces are required where the turbine concrete foundation will be constructed and the turbine towers will be erected. Sufficient working space is also required for the establishment, assembly and operational movements of the cranes while erecting the wind turbines, as well as space for the access of abnormal transport vehicles and temporary placement of turbine components. The proposed size of these turbine platforms will be approximately 45m x 80m, refer to drawing R1011-D04, Annexure C.

Due to the steep topography of the wind farm site, it is expected that some of the cut face embankments of crane platforms, may be as high as 15m above the platform level. Cut face embankment seems to be stable due to the expected fractured rock formations, but deeper excavation may very well impose unstable geo-technical risks. Geo-technical core drilling investigations are required to confirm the sub-strata conditions and caracteristics.

The storm water run-off onto these large open surfaces and water ponding on these surfaces can be problematic during the construction and turbine erection stages. It is therefore recommended that the majority of storm water run-off from higher areas should be controlled by constructing a cut-off berm (at the top of the cut face embankment), and by providing dedicated storm water discharge channels alongside the platforms. This will prevent potential flooding and storm water damage or disruptions at the crane platform areas.

It is recommended that all initial grass and topsoil removals, should be stockpiled on or near the turbine platforms, at dedicated areas in heaps not exceeding 2,5m. The same natural top-soil and grass material must be used to cover all gravel exposed slopes, especially fill slopes which will be more prone to scouring and erosion, due to higher storm water run-off velocities generated along the hard road surfaces.

6 RECOMMENDATION

It is recommended that this report be adopted in the Detail Design stage to ensure that effective Storm Water Management and Erosion Control principles be exercised during the planning and construction of all civil construction aspects of the Wind Farm Development.

The Storm Water Management principles discussed in detail in Section 2 of this report makes several recommendations which should be adhered to and incorporated in the Detail Design Stage.

7 CONCLUSION

This Storm Water Management and Erosion Control Report forms an integral part of the supportive documentation required for the Environmental Impact Assessments (EIA) and application to DEDEAT. An Environmental Management Plan (EMP) will be compiled which incorporating the recommendation of this report, serving as guideline for the Developer to comply with the requirements of the DEDEAT.

ANNEXURE A

- Topographical Map

ANNEXURE B

- Stream Crossing Summary Table

R1011 - Roodeplaat Wind Farm, between Uitenhage and Cockscombe, Eastern Cape

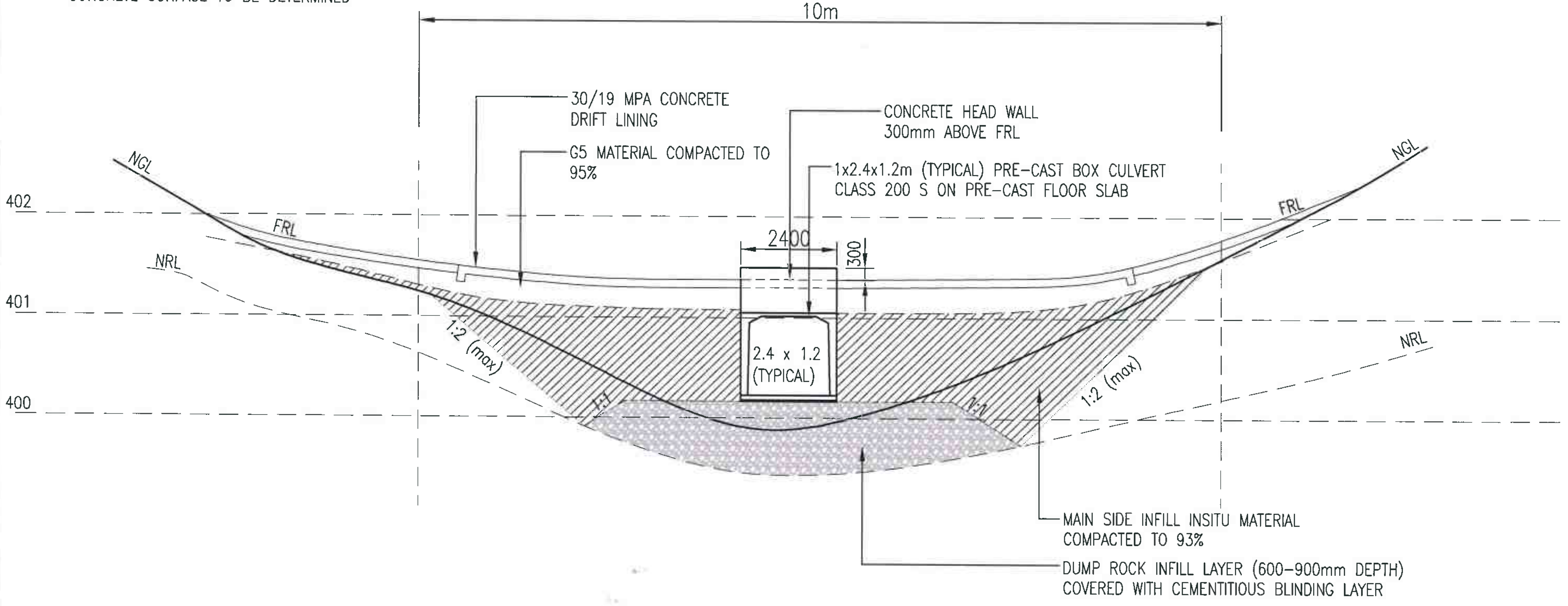
Preliminary Designs (Storm water Run-off Calculations)

Primary Drainage Region :	15. Fish to Tsitsikamma	
Quatarnary Sub-Catchment :	Sundays River : N40B	MAP (mm/year)
Rainfall Station 1 (Morgenpracht) :	0054 177	221
Rainfall Station 2 (Glenconner - Police) :	0055 293	258
Rainfall Station 3 (Adolphskraal) :	0034 121	242

Steam Crossing No.	Steam Crossing Names	Latitude (South)	Longitude (East)	Road Location	Catchment Area (km²)	Longest water path (m)	Flood $Q_{5\ years}$ (m^3/s)	Flood $Q_{10\ years}$ (m^3/s)	Box Culvert sizes for Flood Q_{10} W x H (mm)
				FARM ADOLPHSKRAAL RE/246					
1	SC-A	33°32'02.06"S	25°03'29.94"E	MN50474	3.033	4240	4.053	5.896	1800 x 1200
2	SC-B	33°32'21.57"S	25°03'23.39"E	MN50474	5.394	3455	4.673	7.797	2400 x 1200
New BH	BH 1	33°31'36.82"S	25°03'37.95"E	For New Office Area					
New BH	BH 2	33°31'58.56"S	25°04'51.96"E	For Manufacturing Area					
				FARM KALOTJESKRAAL 247 (PORTION 1)					
3	SC-C	33°32'25.91"S	25°03'25.48"E	MN50474	6.662	6655	7.081	10.299	3600 x 1200
				FARM WILDEPAARDEHOEK 245 (PORTION 1)					
4	SC-D	33°32'39.59"S	25°03'41.48"E	MN50474	0.438	831	0.337	0.490	750 x 450
5	SC-E	33°33'02.58"S	25°03'59.31"E	MN50474	1.395	1580	1.349	1.962	1200 x 900
6	SC-F	33°33'12.15"S	25°03'50.60"E	MN50474	0.075	180	0.058	0.084	450 x 450
7	SC-G	33°33'16.85"S	25°03'55.73"E	MN50474	0.119	1220	0.159	0.231	450 x 450
8	SC-H	33°33'24.37"S	25°03'50.90"E	MN50474	0.458	1240	0.612	0.890	900 x 600
9	SC-I	33°33'43.57"S	25°03'47.16"E	MN50474	5.596	4050	5.410	7.870	3600 x 900
10	SC-J	33°33'43.95"S	25°03'47.65"E	MN50475	0.575	1390	0.473	0.688	750 x 600
11	SC-K	33°33'47.65"S	25°04'09.10"E	MN50474	2.114	2290	2.247	3.262	1500 x 900
12	SC-L	33°33'48.71"S	25°04'32.80"E	MN50474	0.222	974	0.183	0.266	450 x 450
13	SC-M	33°33'48.91"S	25°04'35.67"E	MN50474	0.879	1030	1.207	1.756	1500 x 800
				FARM WILDEPAARDEHOEK 245 (PORTION 2)					
14	SC-N	33°33'54.29"S	25°05'38.75"E	MN50474	7.247	5080	5.960	8.669	2400 x 1200
15	SC-O	33°34'07.63"S	25°05'27.45"E	Unnamed Gravel Road	3.476	4230	4.503	6.549	2100x 1200
				FARM WILDEPAARDEHOEK RE/245					
16	SC-P	33°33'15.67"S	25°06'25.33"E	MN50474	2.102	735	2.723	3.961	1800 x 1200
17	SC-Q	33°32'49.62"S	25°06'48.13"E	MN50474	1.938	1515	2.510	3.652	1500 x 900
18	SC-R	33°32'39.38"S	25°06'55.62"E	MN50474	1.538	1100	1.922	2.795	1500 x 900
19	SC-S	33°34'28.11"S	25°06'02.43"E	MN50476	2.389	2360	3.323	4.834	1500x 1200
20	SC-T	33°34'30.57"S	25°06'09.32"E	MN50476	5.757	5210	0.093	0.136	450 x 450

NOTES:

- EXCAVATION UP TO ROCK BED LEVEL
- CULVERT FLOOR LEVELS TO BE DETERMINED
- TRANSITION FROM GRAVEL ROAD SURFACE TO CONCRETE SURFACE TO BE DETERMINED



TYPICAL DETAIL OF CULVERT CONSTRUCTION AT STREAM CROSSING
1:150

LEGEND:

NGL – NATURAL GROUND LEVEL
NRL – NATURAL ROCK LEVEL (ESTIMATED)
FRL – FINAL ROAD LEVEL
TP – TEST PIT

NO.	DRAWN	REVISION	DATE
0	LG	PRELIMINARY	22/01/2015

DESIGNED: LG
CHECKED: SS
DRAWN: LG

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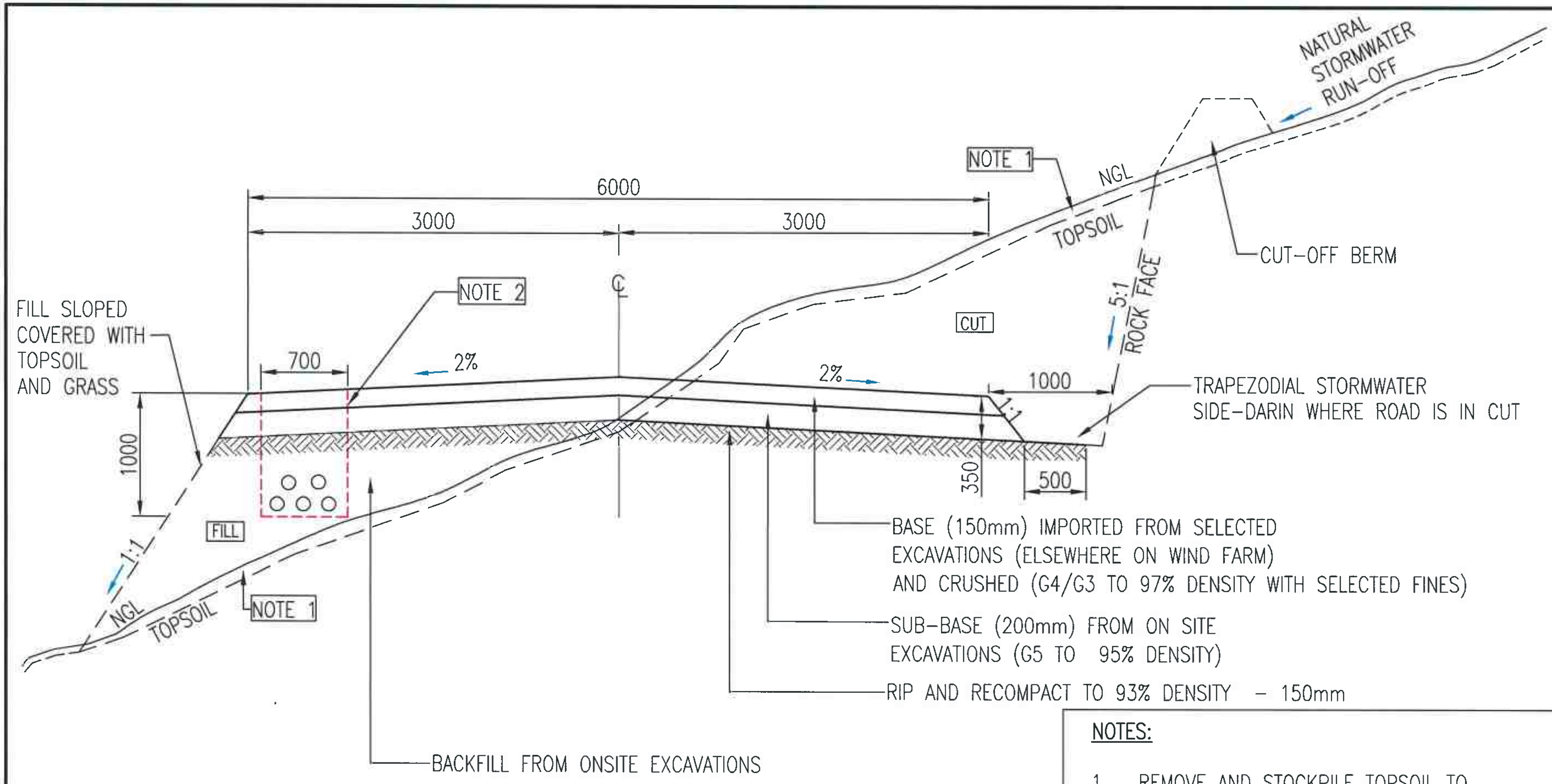
ROODEPLAAT WIND FARM PROPOSED TYPICAL STREAM CROSSING

STATUS: PRELIMINARY
SCALE: 1:150
DRAWING No: R1011-D01
REVISION: 0



NOTES:

1. REMOVE AND STOCKPILE TOPSOIL TO 200mm DEPTH
2. SERVICE TRENCH (SEE DETAILS) WITH ELECTRICAL CABLES AT BOTTOM AND FIBRE OPTIC CABLES ON TOP-COVERED WITH IMPORTED RIVER SAND (MIN 300mm AND BACKFILL)

NO.	DRAWN	REVISION	DATE
2	LG	ADD STORMWATER RUN-OFF	05/04/2016
1	LG	PRELIMINARY	19/03/2015
0	YM	PRELIMINARY	10/02/2015

DESIGNED: YM
CHECKED: SS
DRAWN: YM

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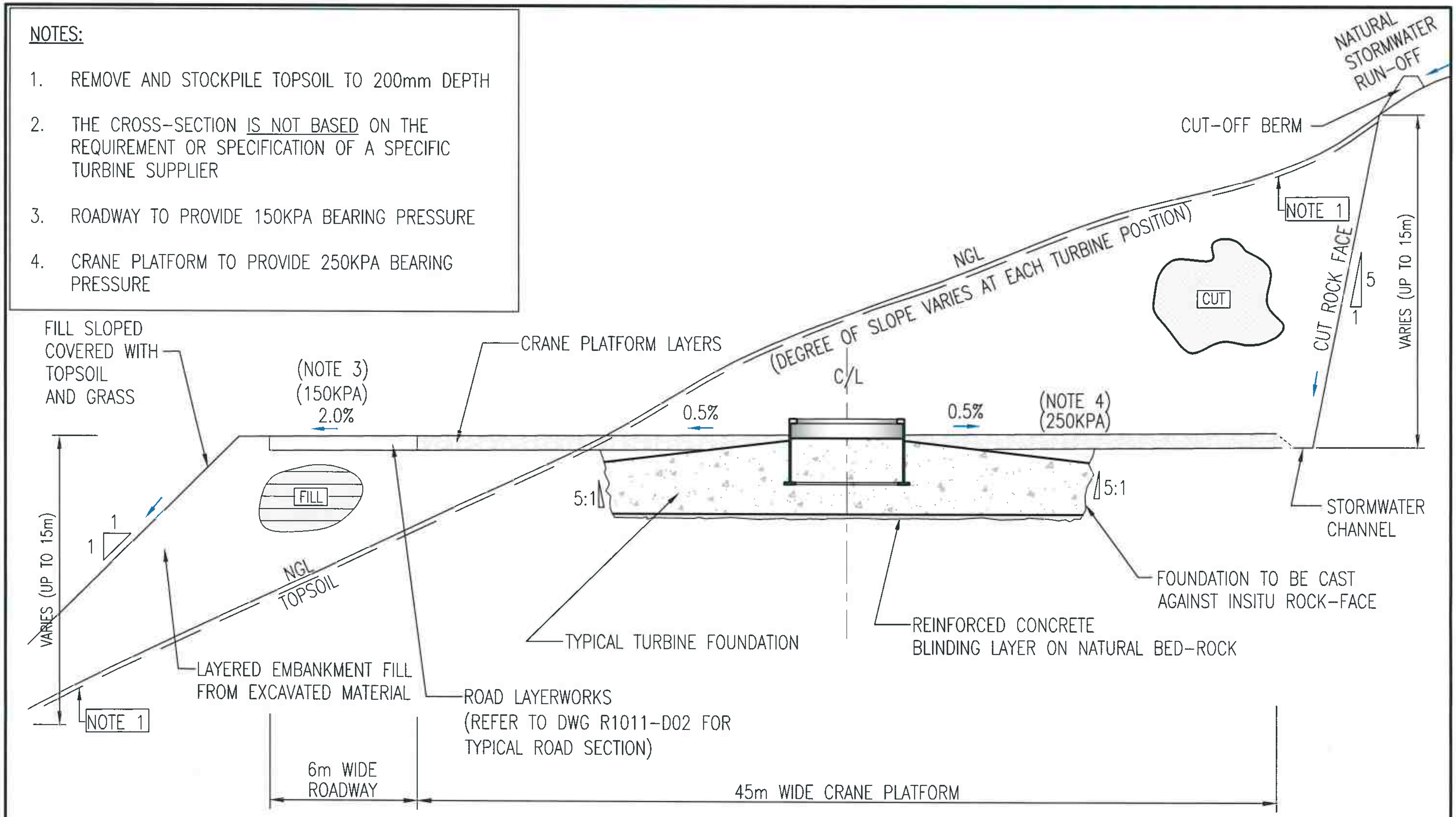
PROJECT DIRECTOR: B.E
PROJECT MANAGER: H.N

ROODEPLAAT WIND FARM PROPOSED TYPICAL ROAD CROSS SECTION

STATUS: PRELIMINARY
SCALE: 1:50
DRAWING No: R1011-D02
REVISION: 2

NOTES:

1. REMOVE AND STOCKPILE TOPSOIL TO 200mm DEPTH
2. THE CROSS-SECTION IS NOT BASED ON THE REQUIREMENT OR SPECIFICATION OF A SPECIFIC TURBINE SUPPLIER
3. ROADWAY TO PROVIDE 150KPA BEARING PRESSURE
4. CRANE PLATFORM TO PROVIDE 250KPA BEARING PRESSURE



NO.	DRAWN	REVISION	DATE
1	L.G.	ADD STORMWATER RUN-OFF	05/04/2016
0	L.G.	PRELIMINARY PLATFORM LAYOUT	27/03/2015

DESIGNED	L.G
CHECKED	S.S
DRAWN	L.G

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PROJECT MANAGER	H.N

**ROODEPLAAT WIND FARM
TYPICAL CROSS-SECTION FOR
TURBINE FOUNDATION & PLATFORM**

STATUS:	SCALE:
PRELIMINARY	N.T.S
DRAWING No:	REVISION:
R1011-D04	1

ANNEXURE C

Typical Drawings :

- R1011-D01 : Typical Stream Crossing
- R1011-D02 : Typical Road Cross Section
- R1011-D04 : Cross Section for Turbine and Foundation Platform

ANNEXURE D

Site Development Plan :
Drawing : R1011-GA-SDP-rev6