



## WATER USE LICENSE FOR MEYS DAM 68

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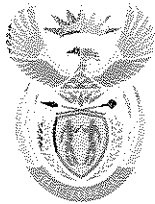
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**Project** : n/a  
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## water affairs

Department:  
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REPUBLIC OF SOUTH AFRICA

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### LICENCE IN TERMS OF CHAPTER 4 OF THE NATIONAL WATER ACT, 1998 (ACT NO 36 OF 1998) (THE ACT)

I, *Maxwell Sirenya*, in my capacity as Director-General in the Department of Water Affairs and acting under authority of the powers delegated to me by the Minister of Water and Environmental Affairs hereby authorizes the following water uses in respect of this licence.

SIGNED: *Maxwell Sirenya*

DATE: 29/08/2012

LICENCE NO: 14/D54E/ACGI/1012

FILE NO: 27/2/2/D54E/F/68/1/3/4/9

1. **LICENSEE:** NATIONAL RESEARCH FOUNDATION SKA SOUTH AFRICA: MEERKAT MEYS DAM 68  
  
**Postal Address:** P.O Box 2600  
Pretoria  
0001
2. **Water uses**
  - 2.1 Section 21(a) of the Act: Taking water from a water resource, subject to the conditions set out in Appendices I and II
  - 2.2 Section 21(c) of the Act: Impending or diverting the flow of water in a water course, subject to the conditions set out in Appendices I and IV
  - 2.3 Section 21(g) of the Act: Disposing of waste in a manner which may detrimentally impact on a water resource, subject to the conditions set out in Appendices I and III
  - 2.4 Section 21(i) of the Act: Altering the bed, banks, course or characteristics of a water course, subject to the conditions set out in Appendices I and IV

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**3. Property on which the use will be exercised**

3.1 Meys Dam 68

**4. Registered owner of the Property**

4.1 National Research Foundation

**5. Licence and Review Period**

5.1 This licence is valid for a period of twenty (20) years from the date of issuance and it may be reviewed every five (5) years.

**6. Definitions**

“Any terms, words and expressions as defined in the National Water Act, 1998 (Act 36 of 1998) shall bear the same meaning when used in this licence.”

“The Regional Head” means the Regional Chief Director: Northern Cape, Department of Water Affairs, Private Bag X6101, Kimberley, 8301.

“Report” refers to: SKA AFRICA: Geohydrological Specialist Investigation, prepared by AGES, dated January 2012.

**7. Description of the activity**

This water use licence authorizes the National Research Foundation to abstract a total of fifteen thousand eight hundred and sixty five (15 865m<sup>3</sup>/a) cubic metres per annum from groundwater resources, for domestic use and construction of satellite dishes, disposal of two thousand eight hundred and eighty (2 880 m<sup>3</sup>/a) cubic metres of waste water into an effluent plant. Unnamed drainage lines will be crossed at 5 points on this property. Gravel and culverts will be made used to construct the roads.

## APPENDIX I

### General conditions for the licence

1. This licence is subject to all applicable provisions of the National Water Act, 1998 (Act 36 of 1998).
2. The responsibility for complying with the provisions of the licence is vested in the Licensee and not any other person or body.
3. The Licensee must immediately inform the Regional Head of any change of name, address, premises and/or legal status.
4. If the property in respect of which this licence is issued is subdivided or consolidated, the Licensee must provide full details of all changes in respect of the property to the Regional Head of the Department within 60 days of the said change taking place.
5. If a water user association is established in the area to manage the resource, membership of the licensee to this association is compulsory.
6. The Licensee shall be responsible for any water use charges or levies imposed by a responsible authority.
7. The licence shall not be construed as exempting the Licensee from compliance with the provisions any other applicable Act, Ordinance, Regulation or By-law.
8. The licence and amendment of this licence are also subject to all the applicable procedural requirements and other applicable provisions of the Act, as amended from time to time.
9. The Licensee shall conduct an annual internal audit on compliance with the conditions of licence. A report on the audit must be submitted to the Regional Head within one month of the finalization of the audit.
10. The Licensee shall appoint an independent external auditor to conduct an annual audit on compliance with the conditions of this licence. The first audit must be conducted within 3 (three) months of the date this licence and a report on the audit must be submitted to the Regional Head within one month of finalization of the report.
11. Flow metering, recording and integrating devices shall be maintained in a sound state of repair and calibrated by a competent person at intervals of not more than two years. Calibration certificates must be available for inspection by the Regional Head or his/her representative upon request.
12. Any incident that causes or may cause water pollution must be reported to the Regional Head or his/her designated representative within 24 hours.

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13. The Licensee must establish and implement a continual process of raising awareness amongst itself, its workers and stakeholders with respect to Water Conservation/Water Demand Management initiatives.

## APPENDIX II

## Section 21 (a) of the Act: Taking water from a water resource

## 1. Abstracting Water

1.1 This licence authorises the taking of fifteen thousand eight hundred sixty five (15 865m<sup>3</sup>/a) cubic metres per annum from groundwater resources, as indicated in the frequency under 1.2 and 1.3.

## 1.2 During construction phase:

1.2.1 Two thousand nine hundred and sixty (2 960m<sup>3</sup>/a) cubic metres per annum will be for domestic use.

1.2.2 Ten thousand and twenty five (10 025 m<sup>3</sup>/a) cubic metres per annum will be for construction purposes and dust suppression.

## 1.3 During operational phase:

1.3.1 Eight hundred and seventy one (871m<sup>3</sup>/a) cubic metres per annum will be for domestic use.

1.4 The water will be abstracted from 7 boreholes as indicated below.

Table 1: Property on which the water uses will be exercised

Water Use	Site and Property Description	Volume (m <sup>3</sup> /a)	Coordinates
21(a)	SKA MeerKAT Site: Mey's Dam 68	2385.52 m <sup>3</sup>	S= 30°43'04.4" E= 21°28'29.6"
21 (a)	SKA MeerKAT Site: Mey's Dam 68	4055.76 m <sup>3</sup>	S=30°43'42.9" E= 21°27'20.5"
21(a)	SKA MeerKAT Site: Mey's Dam 68	1550.52 m <sup>3</sup>	S= 30°43'34.7" E=21°27'29.2"
21(a)	SKA MeerKAT Site: Mey's Dam 68	238.68 m <sup>3</sup>	S= 30°42'33.1" E=21°23'43.4"
21(a)	SKA MeerKAT Site: Mey's Dam 68	238.68 m <sup>3</sup>	S= 30°45'08.6" E=21°25'49.1"
21(a)	SKA MeerKAT Site: Mey's Dam 68	238.68 m <sup>3</sup>	S= 30°42'50.0" E=21°27'34.2"
21(a)	SKA MeerKAT Site: Mey's Dam 68	7156.44m <sup>3</sup>	S=30°42'35.0" E=21°28'15.4"

- 1.5 The quantity of water authorised to be taken in terms of this licence may not be exceeded without prior authorisation by the Minister/Responsible Authority
- 1.6 This licence does not imply any guarantee that the said quantities and qualities of water will be available at present or at any time in the future.
- 1.7 The quantity of water abstracted should be measured on a daily basis and the total should also be measured every last day of the month and the result must be submitted to the Regional Head.
- 1.8 The above mentioned volume may be reduced when the licence is reviewed.
- 1.9 The Licensee shall continually investigate new and emerging technologies and put into practice water efficient devices or apply technique for the efficient use of water containing waste, in an endeavour to conserve water at all times.
- 1.10 The Licensee shall be responsible for any water use charges or levies, which may be imposed from time to time by the Department or responsible authority in terms of the Department's Raw Water Pricing Strategy.
- 1.11 The Department accepts no liability for any damage, loss or inconvenience, of whatever nature, suffered as a result of:
  - 1.11.1 Shortage of water
  - 1.11.2 Inundations or flood
  - 1.11.3 Siltation of the resource; and
  - 1.11.4 Required reserve releases.

## **2. GROUNDWATER MONITORING**

- 2.1 Groundwater Quantity
  - 2.1.1 Abstraction rate for each borehole must be strictly adhered to, to ensure that the downstream aquifer is not influenced and the groundwater resources remain sustainable.
  - 2.1.2 The Licensee must fit a tube into every borehole that is wide enough that a dip meter will be able to fit through the tube to measure the level of the groundwater.
  - 2.1.3 The installation of the water meter must comply with the specifications of the manufacturer and should be SABS approved.
  - 2.1.4 The meters must be approved by this Department before installation. The meter must reach 999 999 m<sup>3</sup> before resetting to 0 m<sup>3</sup>.
  - 2.1.5 Records of water meter readings should be kept and be available for inspection by the Regional Head or his/her representative, upon request.

2.1.6 The Licensee must ensure that all measuring devices are properly maintained and in good working order and must be easily accessible. This include a programme of checking, calibration, and/ or renewal of measuring devices.

2.1.7 Ground water levels must be monitored on a monthly basis during the construction period of the project in 7 boreholes listed in Table 1.

**Table 2: The monitoring locations and the type of monitoring for each borehole**

Site ID	Latitude	Longitude	Location	Monitoring protocol	Quality	Quantity
H/BH 03	-30.7333	21.52672	Upstream	Chemistry	X	
H/BH 29	-30.7796	21.38682	Upstream	Chemistry	X	
H/BH 33	-30.7753	21.49352	Upstream	Chemistry	X	
H/BH 31	-30.7835	21.48791	Upstream	Water level		X
H/BH 28	-30.8002	21.43861	Upstream	Water level		X
H/BH 21	-30.7052	21.36569	Downstream	Water level		X
H/BH 14	-30.6745	21.3784	Downstream	Chemistry and Water level	X	X
H/BH 15	-30.6394	21.3952	Downstream	Chemistry and Water level	X	X
H/BH 17	-30.6554	21.44499	Downstream	Chemistry and Water level	X	X
Road BH01	-30.717	21.4749	On site	Chemistry	X	
WA BH 01	-30.7548	21.4301	On site	Chemistry	X	
WA BH 05	-30.7095	21.3951	On site	Chemistry	X	
WA BH 15	-30.7139	21.45953	On site	Water level		X
WA BH 13	-30.7524	21.43021	On site	Water level		X
WA BH X2	-30.7133	21.39312	On site	Water level		X

## 2.2 Groundwater Quality

2.2.1 Sodium (Na), Chlorite (Cl), Sulfate (SO<sub>4</sub>) and Fluoride (F) concentrations in the groundwater is higher than the recommended standards for ideal drinking water and thus these elements must be monitored closely throughout the project period.

2.2.2 Ground water quality and water levels must be monitored on a quarterly basis during the construction period of the project in 15 boreholes listed in Table 2.



- 2.2.3 The Licensee must monitor the parameters listed in Table 3 as indicated on the groundwater report.
- 2.2.4 The first monitoring sample run and field investigation should take place before any construction in order to set up a baseline data set for future reference.
- 2.2.5 After the construction phase of the project the monitoring of water quality chemistry and water levels should continue in the same manner as during construction for a period of two years on a quarterly basis.
- 2.2.6 Any sudden change in water level and/or groundwater quality measurements must be analysed and updated so that the necessary mitigation measures could be taken.

**Table 3 indicates the recommended parameters to test for in the monitoring of water quality. Both field and laboratory parameters are listed.**

Source	Field Measurements	Laboratory analysis: Chemical
Ground water	pH, EC, temperature (measured with instrument during sampling)	NO2 - N; NO3 - N; Cl; SO4; PO4-P; CO3; HCO3; Na; K; Ca; Mg; T Alk; TDS; NH4; Zn; F; Cr; Fe; Mn; Cu; Cd; Co; Pb; Ni; Al; T; pH; EC; TDS; T Hard; LSI; Total Anion; Total Cation

## APPENDIX III

**Section 21(g) of the Act: Disposing of waste in a manner which may detrimentally impact on a water resource**

**1. Evaporation Dam**

The Licensee is authorized for disposal of two thousand eight hundred and eighty (2 880m<sup>3</sup>/a) cubic metres of waste water into an evaporation dam on the property Meys Dam, as indicated under table 4.

**Table 4: Property on which the water uses will be exercised**

Water Use	Site and Property Description	Capacity/ Quantity	Coordinates
21(g)	SKA MeerKAT Site: Mey's Dam 68	Evaporation Dam - 2880 m <sup>3</sup> per annum	S= 30°43'25.8" E= 21°27'19.2"

- 1.1 The capacity of the evaporation dam shall not be exceeded without prior authorization by the responsible authority.
- 1.2 The evaporation dam must be lined to with a double HDPE lining to prevent groundwater pollution. The brine residue from the Reverse Osmosis Plant may also be dispose of into the same evaporation dam.
- 1.3 No evaporation dam may be established within the 1:100 year floodline or within a horizontal distance of 100 metres from any watercourse, borehole or well, excluding boreholes or wells drilled specifically to monitor the pollution of groundwater, or on water-logged ground, or on ground likely to become water-logged, undermined, unstable or cracked.
- 1.4 Waste facilities must be operated and maintained to have a minimum freeboard of 0.8 metres above full supply level and all other water systems related thereto must be operated in such a manner that it is at all times capable of handling the 1:50 year flood-event on top of its mean operating level.
- 1.5 The Licensee must ensure that dirty water from the evaporation dam is not discharged and does not come into contact with clean storm water.
- 1.6 The Licensee must ensure that the evaporation dam is provided with a suitable liner system to prevent contaminated seepage from entering the groundwater system.

## 2 GROUNDWATER MONITORING

- 2.1 A newly drilled borehole should be sampled and water analysis should be done and results incorporated in the report and be sent to this Department.
- 2.2 Additional monitoring points and/or additional variables may from time to time be specified by the Regional Head and shall be incorporated into the monitoring system.
- 2.3 Monitoring boreholes must be clearly marked and numbered, and must be equipped with lockable caps. The Department reserves the right to sample groundwater from the monitoring boreholes at any time for analyses.
- 2.4 All data in respect of monitoring shall be submitted to the Regional Head; for every six months of each year.
- 2.5 The quality of groundwater downstream of the effluent dam must not exceed the limits listed on Table 5 below:

**Table 5: Groundwater Quality Limits**

Substance/parameter	Water Quality limit (groundwater)
pH	6.5-9.0
Electrical conductivity(EC) Ms/m	70
chloride in mg/l	<100
Sulphate(so <sub>4</sub> ) in mg/l	<200
Sodium(Na) in mg/l	<100
Calcium(Ca) in mg/l	<80
Fluoride(F) in mg/l	<0.7
Magnesium(Mg) in mg/l	<70
nitrate in mg/l	<6

## 3 METHOD OF ANALYSES

- 3.1 Analyses must be carried out in accordance with methods prescribed by and obtainable from the South African Bureau of Standards, (SABS), in terms of the Standards Act, Act 30 of 1982.
- 3.2 Approval to use any other method for analysis other than those prescribed by the SABS must be applied for from the Department within 90 days after the licence has been issued and shall not be changed without prior notification to and written

approval by the Regional Head. The laboratory used for monitoring or analytical work's certification must be submitted to the Regional Head within one year of the date of this licence and /or the quality control procedures in place at the time.

- 3.3 All samples must be taken (method of sampling) in accordance with methods prescribed by and obtainable from the South African Bureau of Standards or any other internationally or nationally accepted scientific protocols and practices.

#### **4 STORMWATER MANAGEMENT**

- 4.1 Stormwater leaving the Licensee's premises must in no way be contaminated by any substance, whether such substance is a solid, liquid, vapour or gas or a combination thereof which is produced, used, stored, dumped or spilled on the premises.
- 4.2 Increased runoff due to vegetation clearance and/or soil compaction must be managed, and steps must be taken to ensure that storm water does not lead to bank instability and excessive levels of silt entering the stream.
- 4.3 Stormwater must be diverted from the operation facilities and must be managed in such a manner as to disperse runoff and concentrating the stormwater flow.
- 4.4 Stormwater control dams must be constructed, operated and maintained in a sustainable manner throughout the impacted area.
- 4.5 All stormwater that would naturally run across the pollution areas should be diverted via channels and trapezoidal drains designed to contain 1:50 year flood.
- 4.6 Contaminated water form identified and isolated dirty water management areas must be contained on site and re-used optimally to limit the risk of spillage to the environment, in compliance with legislative requirements.

#### **5 INFORMATION MANAGEMENT**

- 5.1 Monitoring system must be compatible with the Department's Water Management System and / or Microsoft Excel.
- 5.2 The Licensee shall store and manage collected data in such a manner to ensure the correctness of data and prevent corruption of this data until a closure certificate has been issued for the mine. Data must be stored as raw and in processed format.
- 5.3 The Licensee shall develop and update the monitoring system to ensure that the monitoring system qualifies and quantifies all water use and water containing waste disposal and discharge as well as impacts or potential impacts on the water resources.

## **6 AUDITING**

- 6.1 The Licensee must conduct an annual internal audit on compliance with the conditions of this licence. A report on the audit must be submitted to the Regional Head within one (1) month of finalisation of the report, and shall be made available to an external auditor should the need arise.
- 6.2 The Licensee shall appoint an independent external auditor to conduct an annual audit on compliance with the conditions of this licence.

## **7. INSTITUTIONAL ARRANGEMENT WITHIN THE CATCHMENT**

- 7.1 The Licensee shall send a representative to the Forums at which they will be required from time to time to give input and report on compliance to the licence and progress in investigations.
- 7.2 The Licensee shall support all activities within the Forums in support of the establishment of a Catchment Management Agency and the development of a Catchment Management Agency.
- 7.3 The Licensee shall through the Forum or any other suitable body, which all the water users in the catchment can participate and contribute to any studies or actions required by the Licensee by actively contributing financially, provide the relevant expertise, and/or relevant information/data in any investigation as required by the Department that addresses integrated catchment issues.

## **8. FINANCIAL PROVISION**

- 8.1 The Licensee shall make financial provision for investigations, designs, construction, operation maintenance and closure for the site.
- 8.2 The Licensee shall submit the first financial provision thirty six months after the issuance of licence, for approval by the Regional Head.
- 8.3 The financial provision shall be updated, there after annually by 1 November for approval by the Regional Head.

## ANNEXURE IV

**Section 21 (c) of the Act: Impending and diverting the flow of water in a watercourse**

**Section 21 (i) of the Act: Altering the bed, banks, course or characteristics of a watercourse**

### **1. Construction, Operation and Maintenance**

1.1 The Licensee shall carry out and complete all the activities according to the following:

1.1.1 Documents submitted to the Department or the Responsible Authority

1.1.2 Conditions of this licence; and

1.1.3 Any other written direction issued by the Regional Head in relation to this licence.

1.2 The Licensee must submit technical information regarding the planned development to the Regional Head. This report should contain information of civil designs and the impact that the culvert(s) will have on the river system before commencement of the proposed activity (construction)

1.3 The conditions of the authorisation must be brought to the attention of all persons (employees, sub-consultants, contractors etc.) associated with the undertaking of this activity and the applicant shall take such measures that are necessary to bind such persons to the conditions of this licence.

1.4 Construction activities must not take place within the 1:100 year flood-line or within a horizontal distance of 100 metres from any watercourse, estuary, borehole or well, whichever is the greatest, unless authorised by this licence.

1.5 Compensation measures for damage to and or mitigation measures must be recommended if avoidance or minimisation of the impacts of the proposed development is not possible or if mitigation measures fail to adequately protect the in-stream and riparian habitat.

1.6 No material with pollution generating potential will be used in any construction activities.

1.7 Necessary erosion prevention mechanisms must be employed to ensure the sustainability of all structures.

1.8 The Licensee must ensure that structures such as the river diversions, river road crossings, weirs and the culverts are not damaged excessively by floods exceeding the magnitude of floods occurring on average once in every 100 years.

- 1.9 The structure of temporary crossings must be non-erosive, structurally stable and must not induce any flooding or safety hazard. Temporary crossings must be inspected regularly for accumulation of debris, blockage, erosion of abutments and overflow areas. Debris must be removed and damages must be repaired and reinforced immediately.
- 1.10 Construction activities must start up-stream and proceed into a down-stream direction, so that the recovery processes can start immediately, without further disturbance from upstream construction works.
- 1.11 Construction activities must be scheduled to take place during dry seasons when flows are lowest.
- 1.12 Natural migration of aquatic biota and upstream movement of fish must not be disturbed.
- 1.13 The development may not impede natural drainage lines.
- 1.14 Construction camp must not be located within the 1:100 year flood line or within 100 meters of any watercourse whatever the greatest.
- 1.15 Vehicles and other machinery must be serviced well above the 1:100 year flood line or within a horizontal distance of 100 meters from any watercourse or estuary. Oils and other potential pollutants must be disposed off at an appropriate licensed site, with the necessary agreement from the owner of such a site.
- 1.16 All reagent storage tanks and reaction units must be supplied with a bunded area built to the capacity of the facility and provided with sumps and pumps return the spilled material back into the system.
- 1.17 The system must be maintained in a state of good repair and standby pumps must be provided.
- 1.18 Any hazardous substances must be handled according to the relevant legislation relating to transport, storage and use of the substance.
- 1.19 Pollutions caused by spills from the conveyances must be prevented through proper maintenance and effective protective measures especially near all stream crossings.
- 1.20 Any access roads or temporary crossings must be:
  - 1.20.1 non-erosive, structurally stable and should not induce any flooding or safety hazard.
  - 1.20.2 Any damage must be repaired immediately to prevent further damage.

## **2. STORMWATER MANANGEMENT**

- 2.1 Storm-water shall be diverted from the construction works and roads must be managed in such a manner as to disperse runoff and to prevent the concentration of storm-water flow.
- 2.2 Where necessary works must be constructed to attenuate the velocity of the storm-water discharge and to protect the banks of the watercourse.
- 2.3 Storm-water control works must be constructed, operated and maintained in a sustainable manner throughout the project.
- 2.4 The side slopes of the roads that are 600mm lifted for protection against stormwater must be protected by rock or similar against erosion, topsoil and vegetated.
- 2.5 Increased runoff due to vegetation clearance and/or soil compaction must be managed, and steps must be taken to ensure that storm-water does not lead to bank instability and excessive levels of silt entering the watercourse.
- 2.6 Storm-water leaving the Licensee's premises must in no way be contaminated by any substance, whether such substance is a solid, liquid, vapour or gas or a combination thereof which is produced, used, stored, dumped or spilled on the premises.

## **3. WATER QUALITY**

- 3.1 The in-stream water quality must be analysed on monthly basis during the construction of the activities of the river diversion, at the monitoring points for both upstream and downstream of the activities for the river diversion for the following variables: pH, Electrical Conductivity (mS/M), suspended solids (mg/l), and total dissolved solids (mg/l). Monitoring shall continue on monthly basis for three months after the cessation of the activities.
- 3.2 Activities (such as maintenance) that lead to elevated levels of turbidity of any watercourse must be minimised.
- 3.3 The Licensee must ensure that the quantity of the water to downstream water users does not decrease because of the existence of the river diversions, river crossings, culverts and associated maintenance of road crossings.

## **4. GENERAL SPECIFICATIONS**

- 4.1 A suitably qualified person, appointed by the Licensee, and approved, in writing, by the Regional Head, must be responsible for ensuring that the structures are maintained in line with the design specifications.



- 4.2 The Licensee shall have a full time Civil Engineer Supervisor on the site during construction of river diversions, river crossings and culverts. The contractor shall have an approved Site Agent on the site during construction.
- 4.3 Independent environmental auditor should be appointed by developer to conduct audit within 6 months of date of commencement. Repeat annually thereafter
- 4.4 Development activities should start upstream and work downstream, so that the recovery process can start immediately, without further disturbance from upstream disturbances.
- 4.5 Necessary erosion prevention mechanisms must be employed to ensure the sustainability of all the structures.
- 4.6 Where temporary crossings are included their structure must be non-erosive, structurally stable and may not induce any flooding or safety hazard. Temporary crossings must be inspected regularly for accumulation of debris, blockage, erosion of abutments and overflow areas. Damaged areas shall be repaired and reinforced immediately.
- 4.7 The Licensee must submit a set of as-built detailed drawings (not schematic layouts) to the Regional Head of all river diversions, road crossings, and weirs, when required.
- 4.8 The Licensee must ensure the placement of advertisements of the alteration activities in local newspapers and one regional newspaper as required by the M1.0 Operational Guideline for the control over the alteration of a watercourse.

## 5. PROTECTIVE MEASURES

- 5.1 The diversion structures may not restrict river flows by reducing the overall river width or obstructing river flow.
- 5.2 Operation and storage of equipment within the riparian zone must be limited as far as possible.
- 5.3 All activities within the riparian zone must be restricted as far as possible.
- 5.4 Any material removed from the in stream or riparian habitat, may not be stored within the riparian zone, and may not be stored in such a way that will cause damming of water or wash-away.
- 5.5 Alien vegetation must not be allowed to further colonise the area, and all new alien vegetation recruitment must be eradicated or controlled, using standard methods approved by the Department.
- 5.6 Soils that have become compacted through the activities of the development must be loosened to an appropriate depth to allow seed germination.
- 5.7 The proposed development must not impede the upstream movement of fish.

- 5.8 Increased runoff due to vegetation clearance and/or soil compaction must be managed and steps must be taken to ensure that storm water does not lead to bank instability and excessive levels of silt entering the stream.
- 5.9 Riparian vegetation, including dead trees, may not be removed from the area. In particular, snags (fallen trees and branches) in the river must be protected (i.e. not collected for firewood or any other purpose).
- 5.10 All reasonable steps should be made to minimise noise and mechanical vibrations in the vicinity of the river.

## **6. REHABILITATION**

- 6.1 All disturbed areas must be re-vegetated with an indigenous seed mix in consultation with an indigenous plant expert, ensuring that during rehabilitation only indigenous shrubs, trees and grasses are used in restoring the biodiversity.
- 6.2 Vegetation of the surrounding catchment should also be managed to prevent erosion and siltation of the water course.
- 6.3 The Licensee must take steps necessary to allow movement of aquatic species, including migratory species during the rehabilitation programme.
- 6.4 The Licensee shall embark on a systematic long-term rehabilitation programme to restore natural watercourses to environmentally acceptable and sustainable conditions after construction, which shall include, but not be limited to:
  - 6.4.1 The rehabilitation of disturbed and degraded riparian areas to restore and upgrade the riparian habitat integrity to sustain a bio-diverse riparian ecosystem; and
  - 6.4.2 Annually assess the habitat to monitor the sustainability of the diversions and compliance with these conditions. Action must be taken to rectify any negative impacts.
- 6.5 The Licensee shall ensure that the volume of flow is not reduced except for natural evaporative losses and the authorised attenuation volumes.

## **7. GENERAL SURFACE WATER DESIGN REQUIREMENT AND CRITERIA**

- 7.1 The Licensee shall determine flood lines (1:50 and 1:100 year) prior to construction to ensure risks are adequately managed. Flood lines shall be clearly indicated on the layout plans.
- 7.2 The Licensee shall schedule construction activities at or close to river crossings, streams or wetlands to take place during low flow periods.
- 7.3 The Licensee must clearly indicate all wetlands boundaries within the project area on layout plans.

- 7.4 Design and planning of all proposed construction activities adjacent to or in the vicinity of rivers, streams and wetlands shall consider the following measures:
- 7.4.1 Impact of alignment on springs and wetlands must be investigated and monitored and ensure their continued functioning.
  - 7.4.2 Where appropriate, large individual indigenous riparian trees shall be avoided during construction and shall be clearly marked on site.
  - 7.4.3 All construction roads in or adjacent to the riparian zone must be minimised and if required, be aligned and managed so as to minimise disturbance of the riparian zone and in-stream habitats.
- 7.5 The Licensee shall do bio-monitoring to determine the impact, change, deterioration and improvement of the aquatic system associated with the activities that of impeding, altering or diverting the water resource.

**END OF LICENCE**